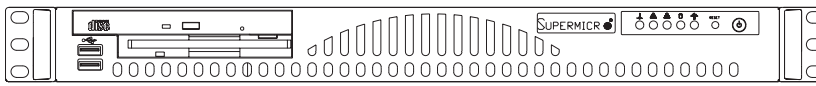
SUPERMICRO®

SUPERSERVER 5013G-M



USER'S MANUAL

Revision 1.0c

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 5013G-M. Installation and maintainance should be performed by experienced technicians only.

The SuperServer 5013G-M is an ultra compact single processor 1U rackmount server based on the SC512 1U rackmount server chassis and the P4SGE mainboard. The P4SGE mainboard supports single Intel® Pentium® 4 processors of up to 3.06 GHz with a 512KB integrated Advanced Transfer Cache or single Intel® Celeron® processors of up to 2.20 GHz with a 128KB integrated Advanced Transfer Cache.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the Super P4SGE mainboard and the SC512 chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 5013G-M into a rack and check out the server configuration prior to powering up the system. If your server was ordered without the processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer to this chapter for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the SuperServer 5013G-M.

Chapter 5: Advanced Motherboard Setup

Chapter 5 provides detailed information on the P4SGE motherboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the motherboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC512 1U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring IDE and peripheral drives and when replacing system power supply units and cooling fans.

Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A: BIOS POST Messages

Appendix B: BIOS POST Codes

Appendix C: System Specifications

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Chapter 1
Introduction

1-1 Overview

The Supermicro SuperServer 5013G-M is an ultra compact, single processor 1U rackmount server. The 5013G-M is comprised of two main subsystems: the SC512 1U rackmount chassis and the P4SGE single 478-pin Pentium 4 microPGA processor mainboard. Please refer to our web site for information on operating systems that have been certified for use with the 5013G-M (www.supermicro.com).

In addition to the mainboard and chassis, various hardware components may have been included with your SuperServer 5013G-M, as listed below.

- One CPU heatsink (SNK-032)
- One (1) slim floppy drive (FPD-PNSC-02)
- One (1) slim CD-ROM drive (CDM-TEAC-24 (B))
- One (1) 5V 32-bit, 33 MHz PCI slot riser card (CSE-RR32-1U)
- One (1) 10-cm blower fan (FAN-0058)
- Rackmount hardware with screws (optional, P/N CSE-PT8):
  Two (2) rack rail assemblies
  Six (6) brackets for mounting the rack rails in a rack/telco rack
- One (1) CD-ROM containing drivers and utilities:
  Intel's® LANDesk Client Manager
  LAN driver
- SuperServer 5013G-M User's Manual

Note: "B" indicates black.

1-2 Mainboard Features

At the heart of the SuperServer 5013G-M lies the P4SGE, a single processor motherboard designed to provide maximum performance. Below are the main features of the P4SGE.

Chipset Overview

Intel's 845GE chipset is made up of two main components:

The Graphics Memory Controller Hub (GMCH)

The I/O Controller Hub (ICH4)

Graphics Memory Controller Hub (GMCH)

The GMCH includes the host (CPU) interface, memory interface, ICH4 interface and 4xAGP interface for the 845GE chipset. It contains advanced power management logic and supports a single channel of DDR SDRAM. The AGP 2.0 interface supports 4x data transfers and operates at a peak bandwidth of 1.6 GB.

An external graphics accelerator card is not required due to the integrated graphics in the 845GE chipset. (If the system BIOS detects an external AGP device, it will disable the integrated graphics.) The integrated graphics controller delivers 3D, 2D and video capabilities, including video conferencing applications. The controller does not utlilize local memory, but accesses graphics data located in system memory. It also includes a cache controller to avoid frequent memory fetches of recently accessed texture data.

I/O Controller Hub (ICH4)

The ICH4 is a fourth-generation I/O Controller Hub subsystem that integrates many of the input/output functions of the 845GE chipset, including a two-channel ATA100 Bus Master IDE controller. The ICH4 also interfaces with the PCI cards and the various communications ports. Nearly all communications between the GMCH and the ICH4 takes place over the hub Interface, which is a 66 MHz/266 MB/s bus.

Processors

The P4SGE supports single 478-pin microPGA Intel® Pentium® 4 processors of up to 3.06 GHz with a 512KB integrated Advanced Transfer Cache or single Intel® Celeron® processors of up to 2.20 GHz with a 128KB integrated Advanced Transfer Cache. Front side (system) bus speeds of 533 or 400 MHz are supported. Please refer to the support section of our web site for a complete listing of supported processors (http://www.supermicro.com/support/).

Memory

The P4SGE has two (2) 184-pin DIMM sockets that can support up to 2 GB of non-ECC, unbuffered DDR-333/266/200 (PC2700/2100/1600) SDRAM modules. Module sizes of 256 MB, 512 MB and 1 GB may be used to populate the DIMM slots.

PCI Expansion Slots

The P4SGE has six 32-bit, 33 MHz PCI slots available. One riser card is included with the system for use with 32-bit PCI cards.

Network Interface Controllers (NIC)

The P4SGE supports two Gb LAN ports (or Network Interface controllers - NIC) based on Intel's 82540EM Ethernet controller chip.

Onboard Controllers/Ports

An onboard IDE controller supports one floppy drive and up to four ATA/100 hard drives or ATAPI devices. Onboard I/O ports include one COM port, one parallel port, two USB ports, PS/2 mouse and keyboard ports, a VGA (graphics) port and two LAN (NIC) ports.

Other Features

Other onboard features that promote system health include eight voltage monitors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.

1-3 Server Chassis Features

The SuperServer 5013G-M is a scaleable 1U rackmount server platform designed with some of today's most state-of-the-art features. The following is a general outline of the main features of the SC512 chassis.

System Power

When configured as a SuperServer 5013G-M, the SC512 chassis includes a single 200W (+12V) power supply.

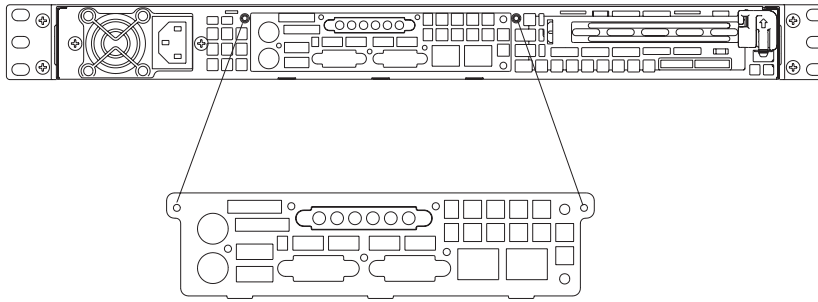
Control Panel

The SC512's control panel provides important system monitoring and control information. LEDs indicate power on, network activity, hard disk drive activity and system overheat conditions. The control panel also includes a main power button and a system reset button. Two USB 2.0 ports are included on the front of the chassis for convenient front-side access.

Rear I/O Panel

The SC512 is a 1U rackmount chassis. Its I/O panel provides a parallel (printer) port, one COM port (the other is internal), two USB ports, PS/2 mouse and keyboard ports, a graphics port and two Ethernet ports. (See Figure 1-1.)

Figure 1-1. Rear I/O Panel



(see page 5-4 for details)

Cooling System

The SC512 chassis has an innovative cooling design that includes a heavy duty 10-cm blower system cooling (intake) fan. The blower fan plugs into a chassis fan header on the motherboard and operates at full rpm continuously. If it breaks down, the ambient air temperature inside the chassis will rise and activate an overheat LED.

1-4 Contacting Supermicro

Headquarters

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980 Rock Ave.
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Fax: +1 (408) 503-8008
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Fax: +886-(2) 8226-3991
Web Site: www.supermicro.com.tw
Technical Support:
Email: support@supermicro.com.tw
Tel: 886-2-8228-1366, ext.132 or 139

Chapter 2
Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 5013G-M up and running. Following the steps in the order given should enable you to have the system operational within a minimal amount of time. This quick setup assumes that your 5013G-M system has come to you with the processor and memory preinstalled. If your system is not already fully integrated with a motherboard, processor, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the SuperServer 5013G-M

You should inspect the box the SuperServer 5013G-M was shipped in and note if it was damaged in any way. If the server itself shows damage, you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the SuperServer 5013G-M. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The optional rackmount hardware package for the SuperServer 5013G-M includes two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimal amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches).
- Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.

Warnings and Precautions!

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In a single rack installation, stabilizers should be attached to the rack.
- In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the power supply units to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

2-4 Installing the SuperServer 5013G-M into a Rack (rack hardware optional)

This section provides information on installing the SuperServer 5013G-M into a rack unit. If the 5013G-M has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. The following is a guideline for installing the 5013G-M into a rack with the optional rack hardware. You should also refer to the installation instructions that came with the rack unit you are using.

Identifying the Sections of the Rack Rails

You may have received two rack rail assemblies (optional) with the SuperServer 5013G-M. Each of these assemblies consist of two sections: an inner fixed chassis rail that secures to the 5013G-M (A) and an outer fixed rack rail that secures directly to the rack itself (B). A sliding rail guide sandwiched between the two should remain attached to the fixed rack rail (see Figure 2-1). The A and B rails must be detached from each other to install.

To remove the fixed chassis rail (A), pull it out as far as possible - you should hear a "click" sound as a locking tab emerges from inside the rail assembly and locks the inner rail. Then depress the locking tab to pull the inner rail completely out. Do this for both the left and right side rack rail assemblies.

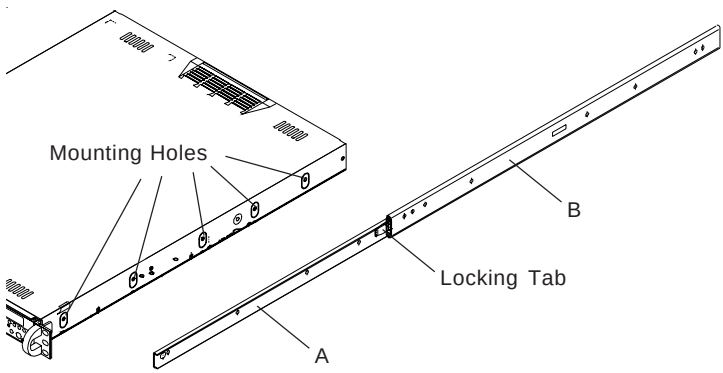


Figure 2-1. Identifying the Sections of the Rack Rails

Installing the Chassis Rails

Position the fixed chassis rail sections you just removed along the side of the 5013G-M chassis making sure the five screw holes line up. Note that these two rails are left/right specific. Screw the rail securely to the side of the chassis (see Figure 2-2). Repeat this procedure for the other rail on the other side of the chassis. You will also need to attach the rail brackets when installing into a telco rack.

Locking Tabs: As you have seen, both chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. Secondly, these tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

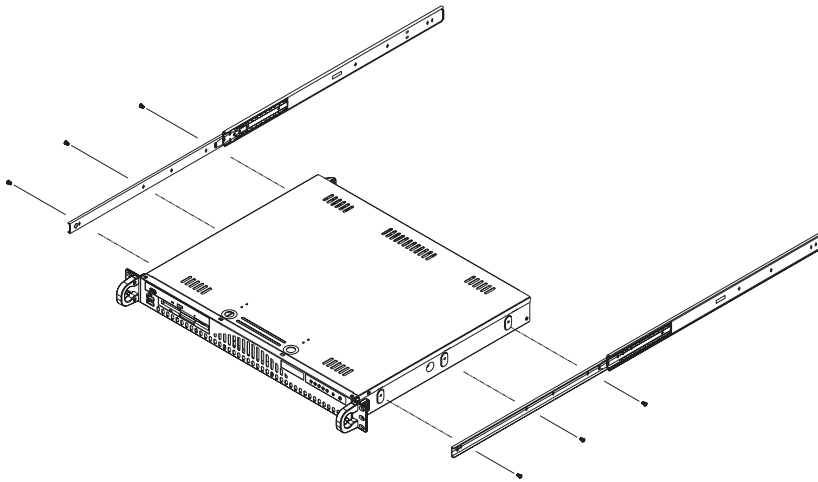


Figure 2-2. Installing Chassis Rails

Installing the Rack Rails

Determine where you want to place the SuperServer 5013G-M in the rack (see Rack and Server Precautions in Section 2-3). Position the fixed rack rail/sliding rail guide assemblies at the desired location in the rack, keeping the sliding rail guide facing the inside of the rack. Screw the assembly

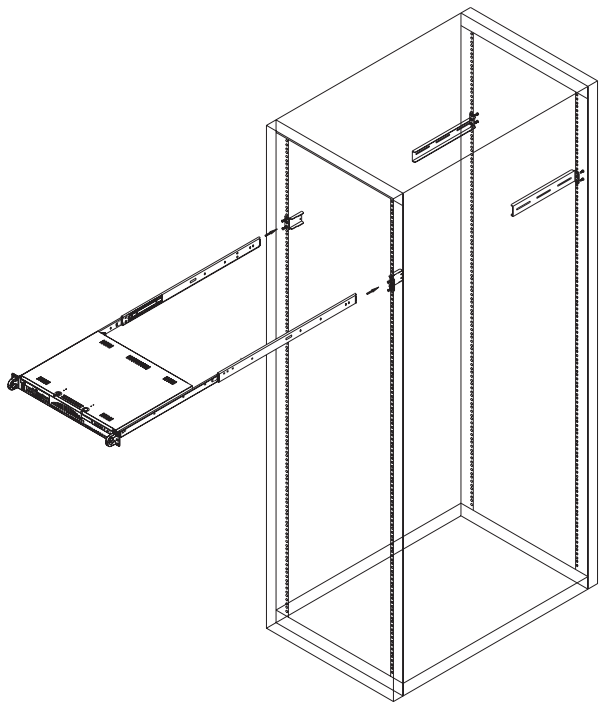
securely to the rack using the brackets provided. Attach the other assembly to the other side of the rack, making sure that both are at the exact same height and with the rail guides facing inward.

Installing the Server into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack. Do this by lining up the rear of the chassis rails with the front of the rack rails. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). See Figure 2-3.

When the server has been pushed completely into the rack, you should hear the locking tabs "click". Finish by inserting and tightening the thumbscrews that hold the front of the server to the rack.

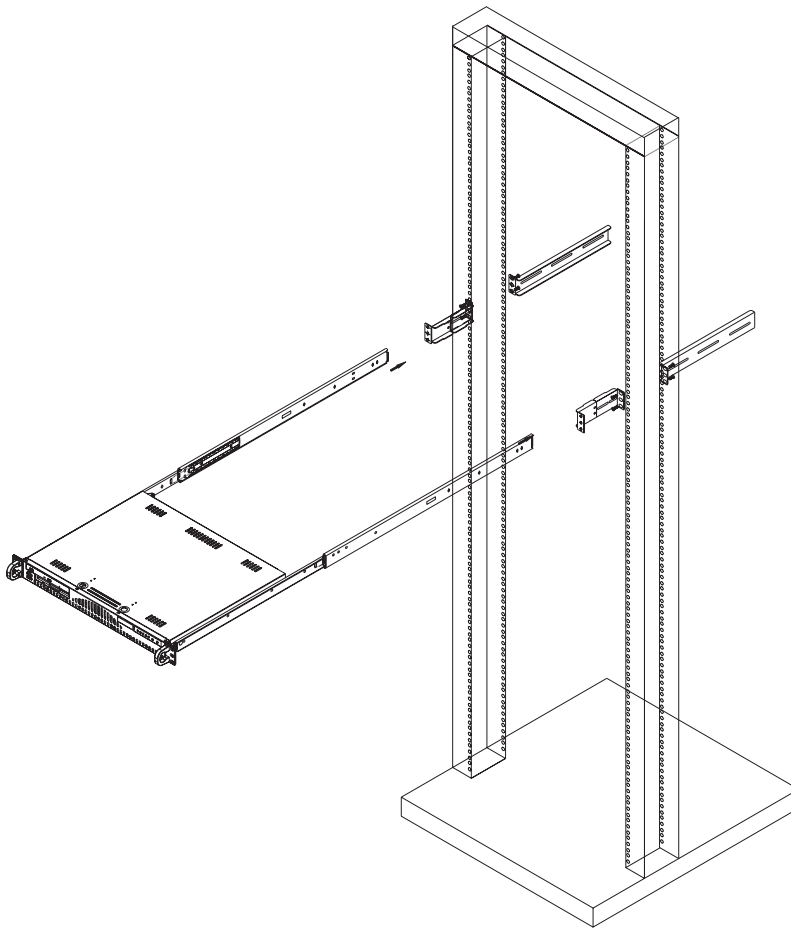
Figure 2-3. Installing the Server into a Rack



Installing the Server into a Telco Rack

If you are installing the SuperServer 5013G-M into a Telco type rack, follow the directions given on the previous pages for rack installation. The only difference in the installation procedure will be the positioning of the rack brackets to the rack. They should be spaced apart just enough to accommodate the width of the telco rack.

Figure 2-4. Installing the Server into a Telco Rack



2-5 Checking the Motherboard Setup

After you install the 5013G-M in the rack, you will need to open the unit to make sure the motherboard is properly installed and all the connections have been made.

1. Accessing the inside of the 5013G-M (Figures 2-5)

First, release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Remove the two screws that secure the top cover to the chassis (located just behind the handles). Next, depress the two buttons on the top of the chassis to release the top cover. There is a large rectangular recess in the middle front of the top cover to help you push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server.

2. Check the CPU (processor)

You may have one processor already installed into the system board. Each processor should have its own heatsink attached. See Chapter 5 for instructions on processor installation.

3. Check the system memory

Your 5013G-M server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 5.

4. Installing add-on cards

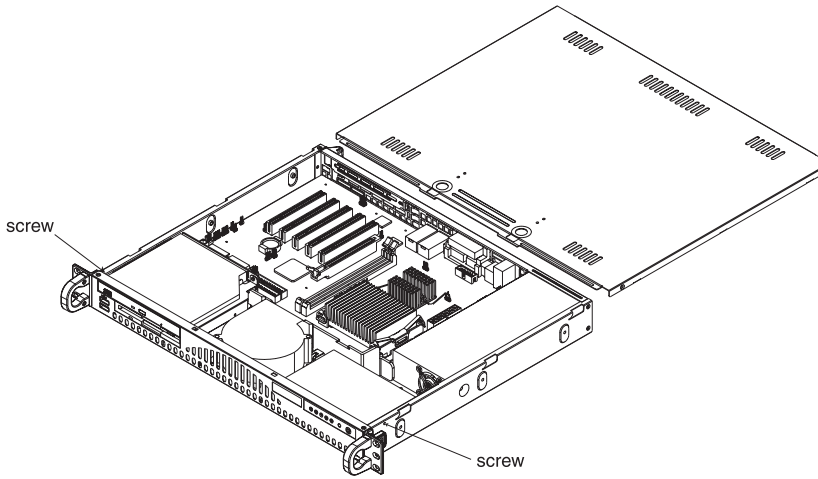
If desired, you can install an add-on card to the system. See Chapter 5 for details on installing a PCI add-on card.

5. Check all cable connections and airflow

Make sure all power and data cables are properly connected and not blocking the airflow. See Chapter 5 for details on cable connections. Also, check the air seals for damage. The air seals are located under the blower fan and beneath the frame cross section that separates the drive bay area from the motherboard area of the chassis.

Note: Make sure that the air seals are properly installed.

Figure 2-5.
Accessing the Inside of the SuperServer 5013G-M



2-6 Checking the Drive Bay Setup

Next, you should check to make sure the peripheral and the IDE drives have been properly installed and all connections have been made.

1. Accessing the drive bays

All drives can be accessed from the front of the server. For servicing the CD-ROM and floppy drives, you will need to remove the top chassis cover.

2. Installing a CD-ROM and floppy disk drives

Refer to Chapter 6 if you need to reinstall a CD-ROM and/or floppy disk drive to the system.

3. Check the IDE disk drives

Depending upon your system's configuration, your system may have an IDE hard drive already installed. If you need to install an IDE hard drive, please refer to the appropriate section in Chapter 6.

4. Check the airflow

Airflow is provided by a 10-cm input fan and one (optional) 4-cm cooling fan. The system component layout was carefully designed to promote sufficient airflow through the small 1U rackmount space. Also note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

5. Supplying power to the system

The last thing you must do is to provide input power to the system. Plug the power cord from the power supply unit into a high-quality power strip that offers protection from electrical noise and power surges. It is recommended that you use an uninterruptible power supply (UPS). Finally, depress the power button on the control panel to power up the system.

Chapter 3
System Interface

3-1 Overview

There are several LEDs on the control panel as well as one on the motherboard to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the chassis control panel. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

3-2 Control Panel Buttons

There are two push-button buttons located on the front of the chassis. These are (in order from left to right) a reset button and a power on/off button.

RESET

- **RESET:** The reset switch reboots the system.

- **POWER:** This is the main power switch, which is used to apply or turn off the main system power. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

3-3 Control Panel LEDs

The control panel located on the front of the SC512 chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

- **OVERHEAT:** Indicates an overheat condition in the chassis. This may be caused by cables obstructing the airflow in the system, or the ambient room temperature being too warm. You should also check to make sure that the chassis cover is installed and that all fans are present and operating normally. Finally, check the air seals for damage. The air seals are located under the blower fan and beneath the frame cross section that separates the drive bay area from the motherboard area of the chassis.

NIC2

- **NIC2:** Indicates network activity on LAN2 when flashing.

NIC1

- **NIC1:** Indicates network activity on LAN1 when flashing.

- **HDD:** Indicates IDE channel activity. On the SuperServer 5013G-M, this light indicates CD-ROM drive activity when flashing.

- **Power:** Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

3-4 Motherboard LEDs

- **PW (Power_On) LED**

There is one PW (Power_on) LED on the motherboard. When illuminated, it indicates that system power is present on the motherboard. This LED is located in the corner of the P4SGE near the DIMM2 slot.

Notes

Chapter 4
System Safety

4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 5013G-M from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.

- Do not work alone when working with high voltage components.

- Power should always be disconnected from the system when removing or installing main system components, such as the motherboard, memory modules and IDE/floppy drives. When disconnecting power, you should first power down the system with the operating system first and then unplug the power cords of all the power supply units in the system.

- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.

- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.

- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.

- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets.

- Motherboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites. This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. See Figure 4-1.

- CD-ROM Laser: **CAUTION** - this server may have come equipped with a CD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the SuperServer 5013G-M clean and free of clutter.

- The SuperServer 5013G-M weighs approximately 15.5 lbs (7 kg). When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

4-3 ESD Precautions

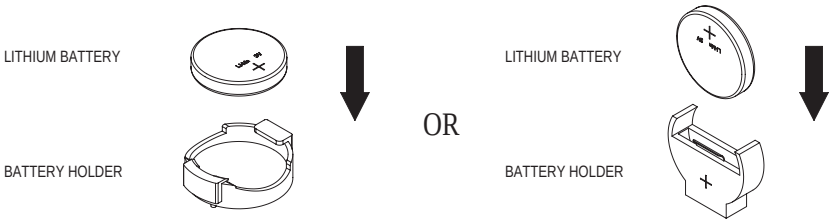
Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the 5013G-M is operating to assure proper cooling. Out of warranty damage to the 5013G-M system can occur if this practice is not strictly followed.

Figure 5-1. Installing the Onboard Battery



Chapter 5
Advanced Motherboard Setup

This chapter covers the steps required to install the P4SGE motherboard into the SC512 chassis, connect the data and power cables and install add-on cards. All motherboard jumpers and connections are also described. A layout and quick reference chart are included in this chaptor for your reference. Remember to completely close the chassis when you have finished working with the motherboard to better cool and protect the system.

5-1 Handling the P4SGE Motherboard

Electric-static discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully (see previous chapter). To prevent the P4SGE motherboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from electric static discharge.

Precautions

- Use a grounded wrist strap designed to prevent Electric Static Discharge (ESD).
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

The motherboard is shipped in antistatic packaging to avoid electrical static discharge. When unpacking the board, make sure the person handling it is static protected.

5-2 Motherboard Installation

This section explains the first step of physically mounting the P4SGE into the SC512 chassis. Following the steps in the order given will eliminate the most common problems encountered in such an installation. To remove the motherboard, follow the procedure in reverse order.

1. **Accessing the inside of the 5013G-M (see Figure 2-5)**
   Two release buttons are located on the top cover of the chassis. Depressing both of these buttons while pushing the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server. (If already installed in a rack, you must first release the retention screws that secure the unit to the rack. Then grasp the two handles on either side and pull the unit straight out until the rails lock into place.)

2. **Check compatibility of motherboard ports and I/O shield**
   The P4SGE requires a chassis big enough to support a 12" x 9.5" motherboard, such as Supermicro's SC512 1U rackmount. Make sure that the I/O ports on the motherboard align properly with their respective holes in the I/O shield at the back of the chassis.

3. **Mounting the motherboard onto the motherboard tray**
   Carefully mount the motherboard to the motherboard tray by aligning the board holes with the raised metal standoffs that are visible on the bottom of the chassis. Insert screws into all the mounting holes on your motherboard that line up with the standoffs and tighten until snug (if you screw them in too tight, you might strip the threads). Metal screws provide an electrical contact to the motherboard ground to provide a continuous ground for the system.

5-3 Connecting Cables

Now that the motherboard is installed, the next step is to connect the cables to the board. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). The following data cables (with their locations noted) should be connected. (See the layout on page 5-10 for connector locations.)

- IDE Device Cables (J6 and J7)
- Floppy Drive Cable (J5)
- Control Panel Cable (JF1)

Connecting Power Cables

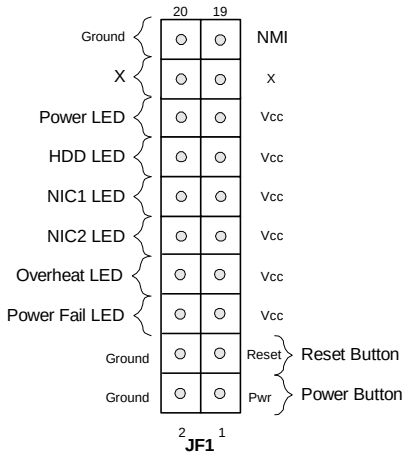
The P4SGE has a 24-pin primary power supply connector ("ATX Power") at J21 for connection to the ATX power supply. In addition, there is a 4-pin secondary power connector at J24 that also must be connected to your power supply. See Chapter 5 for power connector pin definitions.

Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the various front control panel buttons and LED indicators.

All JF1 wires have been bundled into a single ribbon cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis. See Chapter 5 for details and pin descriptions.

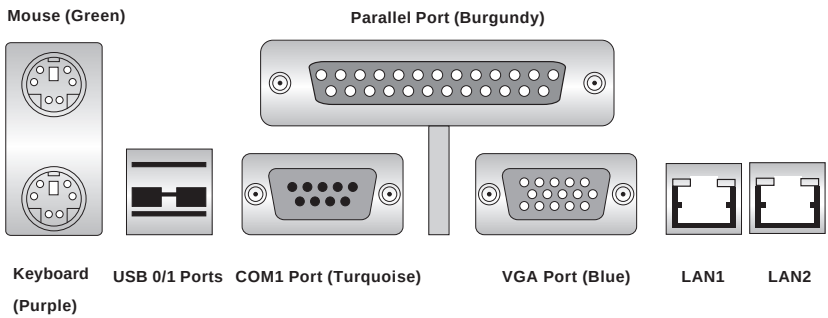
Figure 5-1. Control Panel Header Pins



5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

Figure 5-2. I/O Ports



Note: The COM2 port is a header on the motherboard, located beside PCI slot #6.

5-5 Installing Processors

Avoid placing direct pressure to the top of the processor package. Always remove the power cord first before adding, removing or changing any hardware components.

Processor Support

The P4SGE has one 478-pin microPGA socket, which supports Intel Pentium 4 processors of up to 3.06 GHz with a 512KB integrated Advanced Transfer Cache or single Intel Celeron processors of up to 2.20 GHz with a 128KB integrated Advanced Transfer Cache

1. Lift the lever on the CPU socket.

2. Install the CPU in the socket. Make sure that Pin 1 of the CPU is seated on Pin 1 of the socket (both corners are marked with a triangle).

3. Press the lever down until you hear it *click* into the locked position.

4. Apply the proper amount of thermal compound to the CPU die. Place the heatsink on top of the CPU and press firmly downward - do not twist or slide the heatsink to seat the thermal compound.

5. Secure the heat sink by locking the retention clips into their proper position.

6. Connect the CPU fan cable to the CPU Fan header on the motherboard.

Figure 5-3. 478-pin Socket: Empty and with Processor Installed

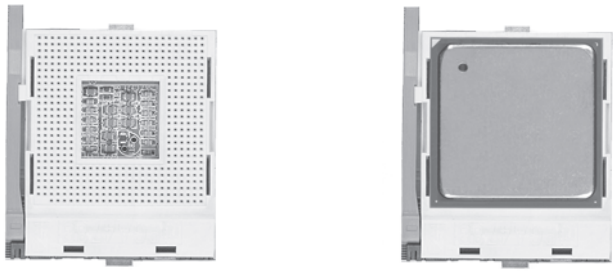
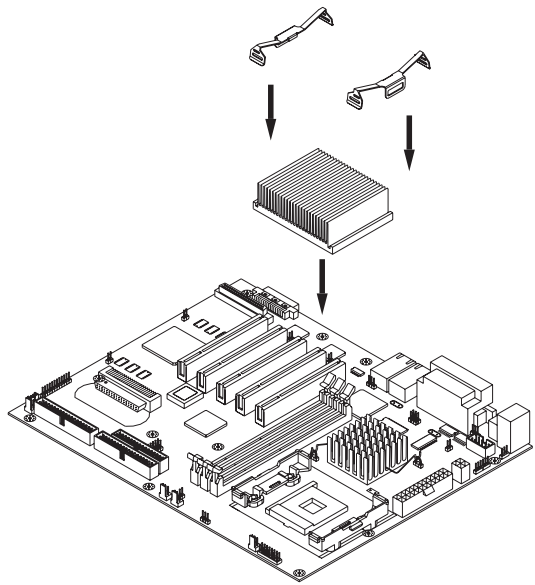


Figure 5-4. Heatsink Installation



5-6 Installing Memory

CAUTION! Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

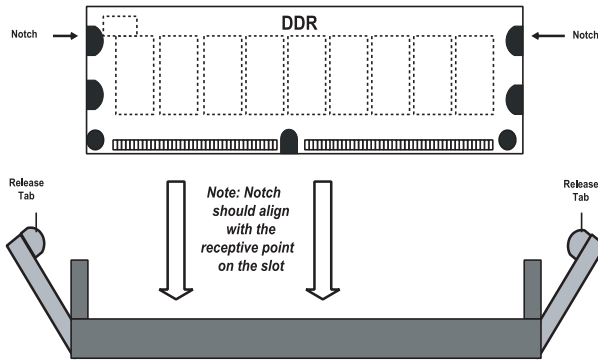
1. Memory support

The P4SGE has three DIMM slots that support both double-sided and single-sided non-ECC unbuffered DDR-333/266/200 (PC2700/2100/1600) SDRAM modules for a maximum of 2 GB main memory.

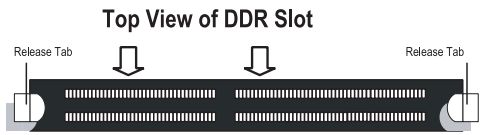
2. Installing memory modules

Insert each memory module vertically into a DIMM slot. Pay attention to the notch along the bottom of the module to prevent inserting it incorrectly. Gently press down on the DIMM module until it snaps into place in the slot (see Figure 5-5).

Figure 5-5. DIMM Installation



To Install: Insert module vertically and press down until it snaps into place. Pay attention to the bottom notch.
To Remove: Use your thumbs to gently push each release tab outward to free the DIMM from the slot.

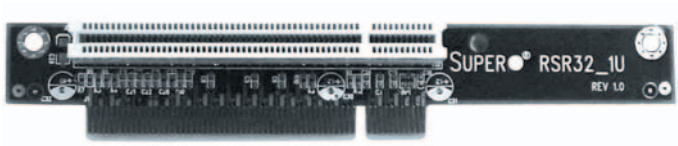


5-7 Adding PCI Cards

1. 32-bit PCI slot

The P4SGE has six 32-bit, 33 MHz 5V PCI slots. A riser card designed specifically for use in the 512 1U rackmount chassis is included with your system. This riser card allows an installed PCI card to sit at a 90 degree angle so it can fit inside the chassis. This riser card accommodates 32-bit, 33 MHz 5V PCI cards (see Figure 5-6).

Figure 5-6. 32-bit, 33 MHz 5V Riser Card



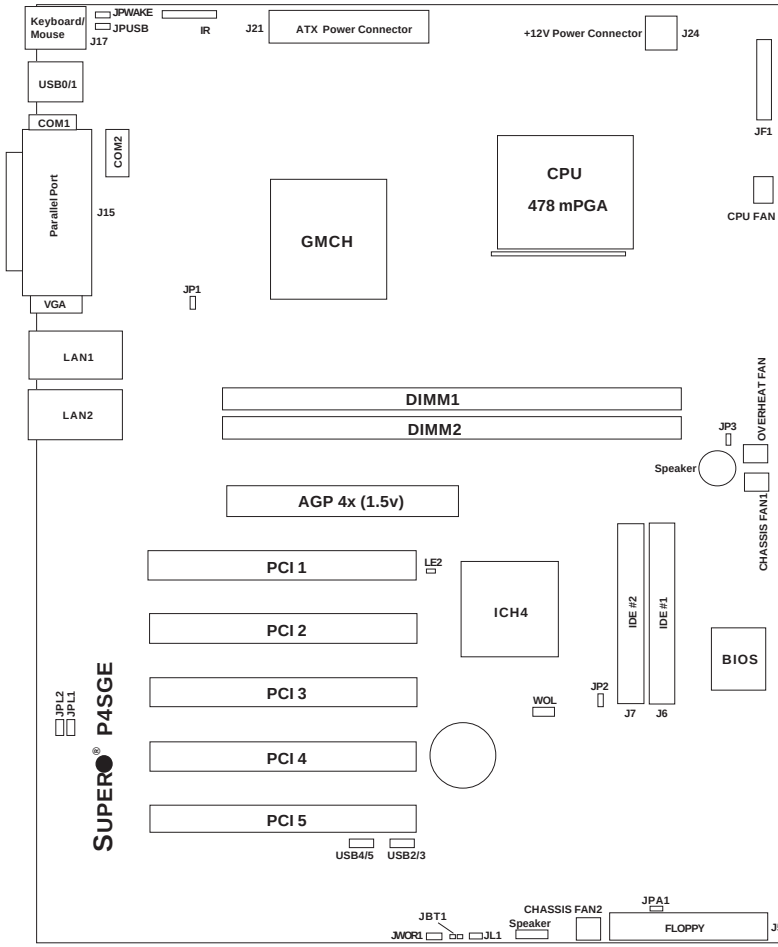
2. PCI card installation

The system should be powered down when adding or removing PCI cards. Begin by removing the top cover of the chassis. You will see a metal enclosure that houses the riser card. Remove this housing by lifting the two plastic levers at either end and pulling the housing up and out of the chassis. The riser card is attached to the inside top of the housing. Release the latch that secures the PCI slot I/O shields to the housing by pulling it away from the housing. Remove the shield and insert a PCI card into the slot on the riser card, pushing down with your thumbs evenly on both sides of the card. After the card has been added, push the latch back into position. Finish by replacing the top chassis cover and powering up the system.

Note: The PCI slot I/O shields protect the serverboard and its components from EMI and aid in proper ventilation, so make sure there is always a shield covering each slot.

Figure 5-7. Super P4SGE Layout

(not drawn to scale)



Jumpers not indicated are for test purposes only.

P4SGE Quick Reference

Jumpers	Description	Default Setting
JBT1	CMOS Clear	See Section 2-7
JP1	Front Side Bus Speed	Pins 1-2 (Auto)
JP2	Watch Dog Enable	Open (Disabled)
JP3	Fan Select	Open (OH Fan)
JPL1	LAN1 Enable/Disable	Pins 1-2 (Enabled)
JPL2	LAN2 Enable/Disable	Pins 1-2 (Enabled)
JPUSB	USB0/1 Wake Up	Pins 1-2 (Disabled)
JPWAKE	Keyboard Wake-Up	Pins 1-2 (Disabled)

Connectors	Description
Chassis Fan1/2	Chassis Fan Header
COM1/COM2	COM1/COM2 Serial Port Connector/Header
CPU Fan	CPU Fan Header
DIMM1/2	Memory (DIMM) Slots
J1	4xAGP
J5	Floppy Disk Drive Connector
J6/J7	IDE #1/#2 Hard Disk Drive Connectors
J15	Parallel Printer Port
J17	PS/2 Keyboard/Mouse
J21	ATX 12V Power Connector (24-pin)
J24*	ATX 12V Power Connector (4pin)
JF1	Front Control Panel
JL1	Chassis Intrusion Header
JOH 1	Overheat LED
JWOR1	Wake-On-Ring Header
LAN1/LAN2	Gb Ethernet Ports
LE2	5v Standby Warning LED
Overheat Fan	Overheat (Thermal) Fan
USB0/1	Universal Serial Bus Port 0/1
USB2/3/4/5	Universal Serial Bus Header 2/3/4/5
WOL	Wake-On-LAN

* The 4-pin connector at J24 must be connected to meet the safety requirements of the ATX 12V specifications.

5-8 Connector Definitions

Power Supply Connectors

The primary power supply connector on the P4SGE meets the SSI (Superset ATX) 24-pin specification. Refer to the table on the right for the pin definitions of the ATX 24-pin power connector. You must also connect the 4-pin J24 power connector to your power supply. Refer to the table below right for the J24 (12V) connector.

ATX Power Supply 24-pin Connector Pin Definitions (J21)

Pin Number	Definition	Pin Number	Definition
13	+3.3V	1	+3.3V
14	-12V	2	+3.3V
15	COM	3	COM
16	PS_ON#	4	+5V
17	COM	5	COM
18	COM	6	+5V
19	COM	7	COM
20	Res(NC)	8	PWR_OK
21	+5V	9	5VSB
22	+5V	10	+12V
23	+5V	11	+12V
24	COM	12	+3.3V

PWR Supply Color Definition

Color	Definition
Orange	+3.3V
Black	Com
Red	5V
White	Power OK
Yellow	+12V
Purple	5V standby
Brown	-5V

(For reference only)

Required Connection

+12V 4-pin PWR Connector (J24)

Pins #	Definition
1 & 2	Ground
3 & 4	+12 V

Power Button Connector

The Power Button connector is located on pins 1 and 2 of JF1. This header should be connected to the chassis power button, which you may also configure to put the system into suspend mode (see the Power Button Mode setting in BIOS). To turn off the power when the suspend mode is enabled, depress the power button for at least 4 seconds. See the table on the right for pin definitions.

Power Button Pin Definitions (JF1)

Pin Number	Definition
1	PW_ON
2	Ground

Reset Connector

The Reset Button connector is located on pins 3 and 4 of JF1. This connector attaches to the reset switch on the computer chassis. See the table on the right for pin definitions.

ResetButton Pin Definitions (JF1)

Pin Number	Definition
3	Reset
4	Ground

Power Fail LED Connector

The Power Fail LED connector is located on pins 5 and 6 of JF1. This connector attaches to a power fail LED on the computer chassis (not used on the 5013G-M). See the table on the right for pin definitions.

Power Fail LED Pin Definitions (JF1)

Pin Number	Definition
5	VCC
6	Ground

Overheat LED Connector

The Overheat LED connector is located on pins 7 and 8 of JF1. This connector attaches to an overheat warning LED on the computer chassis. See the table on the right for pin definitions.

OverheatLED Pin Definitions (JF1)

Pin Number	Definition
7	VCC
8	Ground

NIC2 LED Connector

The NIC2 LED connector is located on pins 9 and 10 of JF1. This connector is used to indicate activity on the LAN2 Ethernet port. See the table on the right for pin definitions.

NIC2 LED Pin Definitions (JF1)

Pin Number	Definition
9	VCC
10	Ground

NIC1 LED Connector

The NIC1 LED connector is located on pins 11 and 12 of JF1. This connector is used to indicate activity on the LAN1 Ethernet port. See the table on the right for pin definitions.

NIC1 LED Pin Definitions (JF1)

Pin Number	Definition
11	VCC
12	Ground

HDD LED Connector

The HDD LED is located on pins 13 and 14 of JF1. This connects to the hard drive LED to display hard drive activity. See the table on the right for pin definitions.

HDD LED Pin Definitions (JF1)

Pin Number	Definition
13	VCC
14	Ground

Power_LED Connector

The Power LED connector is located on pins 15 and 16 of JF1. This connection is used to provide LED indication of power being supplied to the system. See the table on the right for pin definitions.

Power LED Pin Definitions (JF1)

Pin Number	Definition
15	VCC
16	Ground

NMI Connector

The NMI LED connector is located on pins 19 and 20 of JF1. Connect these pins to a button to allow you to initiate an NMI (non-maskable interrupt). See the table on the right for pin definitions.

NMI Pin Definitions (JF1)

Pin Number	Definition
19	VCC
20	Ground

CD Header

There are two 4-pin CD headers of different sizes on the motherboard. These allow you to use the onboard sound for audio CD playback. Connect the audio cable from your CD drive to the header that fits your cable's connector. Only one CD header can be use at any one time. See the tables on the right for pin definitions.

Audio CD Header Pin Definitions (CD1)

Pin Number	Definition
1	Left Stereo Signal
2	Ground
3	Ground
4	Right Stereo Signal

Audio CD Header Pin Definitions (CD2)

Pin Number	Definition
1	Right Stereo Signal
2	Ground
3	Left Stereo Signal
4	Ground

Fan Headers

There are four fan headers on the P4SGE, which are designated CPU Fan, Chassis Fan 1, Chassis Fan 2 and Overheat Fan. Connect the fan on your CPU heatsink to the CPU Fan header. See the table on the right for pin definitions.

Fan Header Pin Definitions (CPU, Chassis and Overheat)

Pin Number	Definition
1	Ground (black)
2	+12V (red)
3	Tachometer

Caution: These fan headers are DC power.

Chassis Intrusion

The Chassis Intrusion header is designated JL1. See the motherboard layout in this chapter for the location of JL1 and the table on the right for pin definitions.

Chassis Intrusion Pin Definitions (JL1)

Pin Number	Definition
1	Intrusion Input
2	Ground

Overheat LED (JOH1)

Connect an LED to the JOH1 header to provide warning of chassis overheating. See the table on the right for pin definitions.

Overheat LED Pin Definitions (JOH1)

Pin Number	Definition
1	12VDC
2	OH Active

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located on J17. See the table on the right for pin definitions. The mouse port is above the keyboard port. (See Figure 5-2.)

PS/2 Keyboard and Mouse Port Pin Definitions (J17)

Pin Number	Definition
1	Data
2	NC
3	Ground
4	VCC
5	Clock
6	NC

Universal Serial Bus (USB)

Two Universal Serial Bus 2.0 connectors (USB0 and USB1) are provided for backpanel access. See the table on the right (above) for pin definitions. The P4SGE also provides four additional USB 2.0 headers on the motherboard, which may be used to provide front side chassis access (cables not included). These additional ports are labeled USB2, USB3, USB4 and USB5. See the tables on the right (below) for pin definitions.

USB0/USB1 Port Pin Definitions (J18/J19)

Pin#	Definition
1	+5V
2	P0-
3	P0+
4	Ground

USB2/4

Pin Number	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	Key

USB3/5

Pin Number	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	Ground

Wake-On-LAN

The Wake-On-LAN header is designated WOL on the motherboard. See the table on the right for pin definitions. You must enable the LAN Wake-Up setting in BIOS to use this function. (You must also have a LAN card with a Wake-On-LAN connector and cable to use this feature.)

Wake-On-LAN Pin Definitions (WOL)

Pin Number	Definition
1	+5V Standby
2	Ground
3	Wake-up

Wake-On-Ring

The Wake-On-Ring header is designated JWOR. This function allows your computer to receive and be "awakened" by an incoming call when in the suspend state. See the table on the right for pin definitions. You must also have a WOR card and cable to use WOR.

Wake-On-Ring Pin Definitions (JWOR1)

Pin Number	Definition
1	Ground
2	Wake-up

Serial Ports

Two serial ports are included on the motherboard: COM1 is a port located beside the mouse/keyboard ports and COM2 is a header located on the motherboard near PCI slot 6. See the table on the right for pin definitions.

Serial Port Pin Definitions (COM1, COM2)

Pin Number	Definition	Pin Number	Definition
1	DCD	6	DSR
2	Serial In	7	RTS
3	Serial Out	8	CTS
4	DTR	9	RI
5	Ground	10	NC*

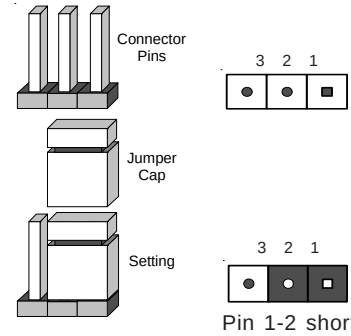
*NC indicates no connection.

5-9 Jumper Settings

Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the motherboard layout pages for jumper locations.

Note: On a two-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either on only one pin or completely removed.



CMOS Clear

JBT1 is used to clear CMOS (which will also clear any passwords). Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To clear CMOS, 1) First unplug the power cord(s) 2) With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver 3) Remove the screwdriver (or shorting device) 4) Reconnect the power cord(s) and power on the system.

Note: *Do not use the PW_ON connector to clear CMOS*.

Chassis/Overheat Fan Select

JP3 allows you to select between use of the Chassis fan and the Overheat fan. The default position is open (Overheat fan). A closed jumper setting forces the chassis fan to always be on. See the table on the right for jumper settings.

Chassis/Overheat Fan Select Jumper Settings (JP3)

Jumper Position	Definition
Open	Chasis Fan
Closed	Overheat Fan

USB Wake-Up

Use JPUSB to enable or disable USB Wake-Up, which allows you to wakeup the system by depressing a key on the keyboard or by clicking the mouse when either is connected to the USB0 or USB1 port. This jumper is used together with the USB Wake-Up function in BIOS. Enable both the jumper and the BIOS setting to allow the system to be woken up. See the table on the right for jumper settings.

USB Wake-Up Jumper Settings (JPUSB)

Jumper Position	Definition
1-2	Disabled
2-3	Enabled

Watch Dog Enable/Disable

JP2 enables and disables the Watch Dog function. Watch Dog is a system monitor that will restart the system if a software application freezes operations. This jumper is used together with the Watch Dog enable function in BIOS. Enable both the jumper and the BIOS setting to use the Watch Dog feature. See the table on the right for jumper settings.

Watch Dog Enable Jumper Settings (JP2)

Jumper Position	Definition
Open	Disabled
Closed	Enabled

Front Side Bus Speed

JP1 is used to set the system (front side) bus speed for the processors. It is best to keep this jumper set to Auto. This jumper is used together with the CPU Clock setting in BIOS. See the table on the right for jumper settings.

Front Side Bus Speed Jumper Settings (JP1)

Jumper Position	Definition
Pins 1-2	Auto
Pins 2-3	400 MHz
Open	533 Mhz

Keyboard Wake-Up

The JPWAKE jumper is used together with the Keyboard Wake-Up function in BIOS. Enable both the jumper and the BIOS setting to allow the system to be woken up by depressing a key on the keyboard. See the table on the right for jumper settings. Your power supply must meet ATX specification 2.01 or higher and supply 720 mA of standby power to use this feature.

Keyboard Wake-Up Jumper Settings (JPWAKE)

Jumper Position	Definition
1-2	Disabled
2-3	Enabled

LAN1 Enable/Disable

Change the setting of jumper JPL1 to enable or disable the onboard LAN1 or NIC (Network Interface Card) on the motherboard. See the table on the right for jumper settings. The default setting is Enabled.

LAN1 (NIC) Enable/Disable Jumper Settings (JPL1)

Jumper Position	Definition
On	Enabled
Off	Disabled

LAN2 Enable/Disable

Change the setting of jumper JPL2 to enable or disable the onboard LAN2 or NIC (Network Interface Card) on the motherboard. See the table on the right for jumper settings. The default setting is Enabled.

LAN2 (NIC) Enable/Disable Jumper Settings (JPL2)

Jumper Position	Definition
On	Enabled
Off	Disabled

5-10 Parallel Port, Floppy Drive, Hard Drive and AGP Connections

Use the following information to connect the floppy and hard disk drive cables.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.
- The 80-wire ATA100/66 IDE hard disk drive cable that came with your system has two connectors to support two drives. This special cable should be used to take advantage of the speed this new technology offers. The blue connector connects to the onboard IDE connector interface and the other connector(s) to your hard drive(s). Consult the documentation that came with your disk drive for details on actual jumper locations and settings for the hard disk drive.

Parallel Port Connector

The parallel port is located on J15. See the table on the right for pin definitions.

Parallel (Printer) Port Pin Definitions (J15)

Pin Number	Function	Pin Number	Function
1	Strobe-	2	Auto Feed-
3	Data Bit 0	4	Error-
5	Data Bit 1	6	Init-
7	Data Bit 2	8	SLCT IN-
9	Data Bit 3	10	GND
11	Data Bit 4	12	GND
13	Data Bit 5	14	GND
15	Data Bit 6	16	GND
17	Data Bit 7	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

Floppy Connector

The floppy connector is located on JP5. See the table on the right for pin definitions.

Floppy Connector Pin Definitions (JP5)

Pin Number	Function	Pin Number	Function
1	GND	2	FDHDIN
3	GND	4	Reserved
5	Key	6	FDEDIN
7	GND	8	Index-
9	GND	10	Motor Enable
11	GND	12	Drive Select B-
13	GND	14	Drive Select A-
15	GND	16	Motor Enable
17	GND	18	DIR-
19	GND	20	STEP-
21	GND	22	Write Data-
23	GND	24	Write Gate-
25	GND	26	Track 00-
27	GND	28	Write Protect-
29	GND	30	Read Data-
31	GND	32	Side 1 Select-
33	GND	34	Diskette

IDE Connectors

There are no jumpers to configure the onboard IDE interfaces J6 and J7. See the table on the right for pin definitions. You must use the ATA100/66 cable included with your system to benefit from the ATA100/66 technology.

IDE Connector Pin Definitions (J6, J7)

Pin Number	Function	Pin Number	Function
1	Reset IDE	2	GND
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	GND	20	Key
21	DRQ3	22	GND
23	I/O Write-	24	GND
25	I/O Read-	26	GND
27	IOCHRDY	28	BALE
29	DACK3-	30	GND
31	IRQ14	32	IOCS16-
33	Addr 1	34	GND
35	Addr 0	36	Addr 2
37	Chip Select 0	38	Chip Select 1-
39	Activity	40	GND

1.5V 4xAGP Slot

The 4xAGP slot is included on the P4SGE. You should first disable the integrated video in BIOS before adding a VGA card to this slot. (See the "On-Chip VGA" setting in the Advanced Chipset Features section in BIOS.) The 4xAGP slot is backward compatible with 2xAGP graphics cards.

To install a VGA card, power down the system and remove the I/O shield corresponding to the AGP slot. Then, pull back the locking tab on the slot before inserting your VGA card. After the card is inserted, close the locking tab if possible (some VGA cards have a notch in the corner of the board to lock it into place, others do not.) Replace all chassis covers before restoring power to the system.

Chapter 6
Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC512 chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows.

Tools Required

The only tool you will need to install components and perform maintainance is a Philips screwdriver.

6-1 Static-Sensitive Devices

Electric Static Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD discharge.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

Figure 6-1. Chassis Front View

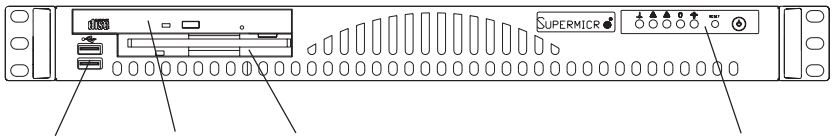
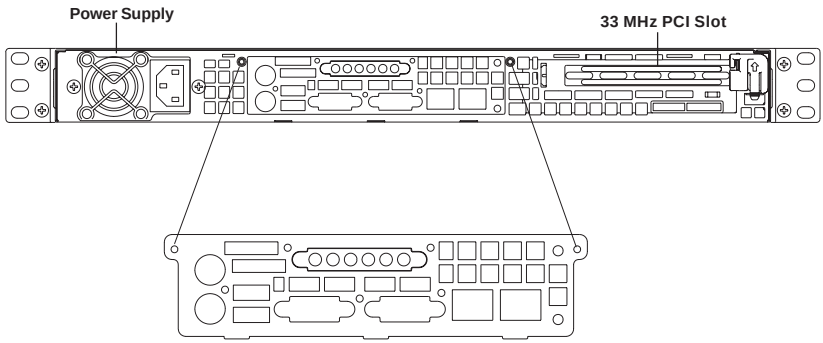


Figure 6-2. Chassis Rear View



6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the motherboard to provide you with system control buttons and status indicators. These wires have been bundled together in a ribbon cable to simplify the connection. Connect the cable from JF1 on the motherboard to JP4 on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both JF1 and JP4. Move all

excess cabling out of the airflow path. The LEDs inform you of system status. See Chapter 3 for details on the LEDs and the control panel buttons. Details on JF1 can be found in Chapter 5.

6-3 System Fans

One 10-cm blower fan provides all the cooling needed for the SuperServer 5013G-M. The chassis includes air seals under the blower fan and at the chassis cross section, which separates the drive bay area from the motherboard area of the chassis to promote better airflow. It is highly important that the air seal is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis. See Figure 6-3 for locations.

System Fan Failure

The blower fan runs at a full 100% rpm. If the fan fails, the ambient air temperature in the chassis will rise and activate the overheat LED on the control panel. You will need to power down the system to replace this fan.

Replacing System Cooling Fan

1. Removing the blower fan

After turning off the power to the system, first remove the chassis cover and unplug the fan cable from the motherboard. Lift the blower fan from the mounting posts and pull it completely out from the motherboard. See Figure 6-3.

2. Installing a new blower fan

Replace the failed fan with an identical 10-cm, 12 volt fan (available from Supermicro). Position the new fan in its proper place in the chassis by fitting the fan onto the fan mounting posts in the chassis. After the new fan has been installed, plug the fan cable back into the same chassis fan header on the motherboard you removed it from. Make sure the air seal under the fan is properly installed and creating a good seal. Power up the system and check that the fan is working properly and that the LED on the control panel has turned off. Finish by replacing the top panel of the chassis.

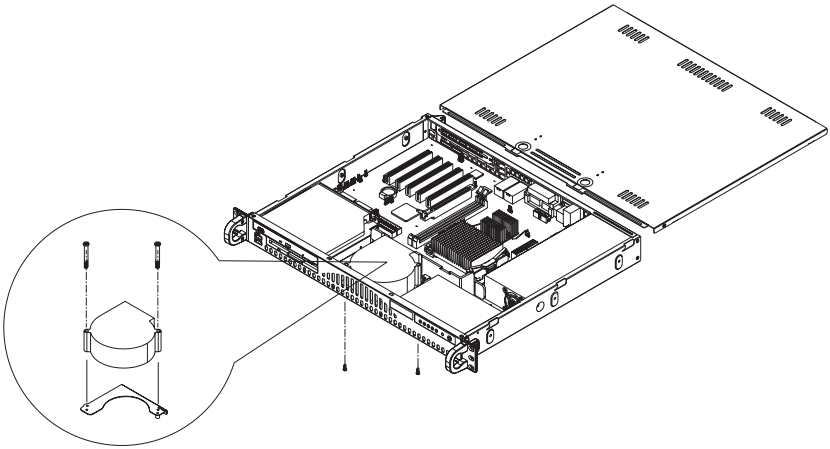


Figure 6-3. Replacing the System Cooling Fan

6-4 Drive Bay Installation/Removal

Accessing the Drive Bays

CD-ROM/IDE/Floppy Disk Drives: For installing or removing the CD-ROM, IDE or floppy disk drives, you will need to gain access to the inside of the 5013G-M by removing the top cover of the chassis.
Note: Only a "slim" CD-ROM drive and a "slim" floppy drive will fit in the 5013G-M.

IDE Drive Installation

1. Installing/removing an IDE drive

The IDE drive bay is located in the front of the chassis, making it easily accessible for installation and removal. The IDE drive is not hot-swappable, meaning system power must be turned off before installing and/or removing one.

To install or remove the drive, first power down the system and then remove the top cover of the chassis. Unscrew the retention screw at the top center of the drive, then push the drive tray out from the back until you can grasp and pull it out through the front of the chassis. Remove the drive from the drive tray.

To add a new IDE drive, install a drive into the tray with the printed circuit board side facing down and so that the mounting holes align with those in the tray. Secure the drive to the tray inside the chassis with the four screws. Replace the top cover when finished.

2. Installing/removing an IDE drive

The IDE drive bay is located in the front of the chassis, making it easily accessible for installation and removal. The IDE drive is not hot-swappable, meaning system power must be turned off before installing and/or removing one. To install or remove a drive, first power down the system and then remove the top cover of the chassis. Unscrew the retention screw at the top center of the drive, then push the drive carrier out from the back until you can grasp and pull it out through the front of the chassis. Remove the drive from the drive carrier. Reverse this procedure when installing a drive carrier, making sure you screw in the retention screw. Replace the top cover when finished.

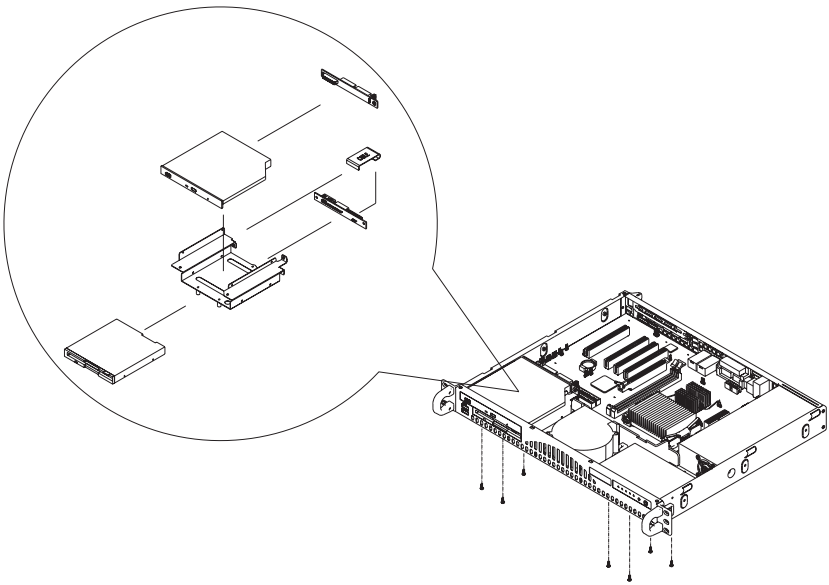


Figure 6-4. Removing the CD-ROM/Floppy Drives

CD-ROM and Floppy Drive Installation

The top cover of the chassis must be opened to gain full access to the CD-ROM and floppy drive bays. Both the CD-ROM and the floppy drives must have a "slim" profile to fit into the 5013G-M.

First, release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Remove the two screws that secure the top cover to the chassis (located just behind the handles). Next, depress the two buttons on the top of the chassis to release the top cover and at the same time, push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server. You must power down the system before installing or removing CD-ROM, floppy or IDE drives. See Figure 6-4.

Drives mount on rails and should "click" into place to be correctly and fully installed in their bays.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

6-5 Power Supply

The SuperServer 5013G-M has a single 200 watt power supply. This power supply has an auto-switching capability, which enables it to automatically and operate with 100 or 240 volt inputs. Depress the main power button on the front of the chassis and then unplug the AC power cord to completely remove power from the system before removing the power supply.

Power Supply Failure

If the power supply unit fails, the system will shut down and you will need to replace the power supply unit. Replacement units can be ordered directly from Supermicro (PWS-0043 - see contact infomation in Chapter 1).

Replacing the Power Supply

1. Accessing the inside of the SuperServer 5013G-M

To replace the power supply, you must first remove the top chassis cover. To do so, first release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover and push it away from you. You can then lift the top cover from the chassis to gain full access to the inside of the server.

2. Removing the power supply

First unplug the power cord from the system. To remove the failed power unit, remove the two screws on the back of the power supply, which secure it to the chassis. You can then lift the unit straight out of the chassis. (The power cord should have already been removed.)

3. Installing a new power supply

Replace the failed unit with another unit of the same wattage. It is highly recommended to replace it with the exact same power supply. Carefully insert the new unit into position in the chassis and secure it with the two screws at the rear of the unit. Before reconnecting the power cord, make sure the power switch on the power supply is in the off position. Then reconnect the power cord, replace the chassis top cover and push the unit back into the rack. Finish by depressing the power button on the system's control panel.

Notes

Chapter 7
BIOS

7-1 Introduction

This chapter describes the AwardBIOS for the P4SGE. The Award ROM BIOS is stored in a Flash chip and can be easily upgraded using a floppy disk-based program.

Note: Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Refer to the Manual Download area of our web site for any changes to BIOS that are not reflected in this manual.

System BIOS

The BIOS is the Basic Input Output System used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The AwardBIOS Flash chip stores the system parameters, such as amount of memory, type of disk drives and video displays, etc. CMOS requires very little power. When the computer is turned off, a back-up battery provides power to the BIOS Flash chip, enabling it to retain the system parameters. Each time the computer is powered-on, the computer is then configured with the values stored in the BIOS ROM by the system BIOS, which gains control when the computer is powered on.

How To Change the Configuration Data

The CMOS information that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing <Del> at the appropriate time during system boot.

Starting the Setup Utility

Normally, the only visible POST (Power On Self Test) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Chipset and Power menus. Section 7-3 gives detailed descriptions of each parameter setting in the Setup utility.

7-2 Running Setup

**Optimal default settings are in bold text unless otherwise noted.*

The BIOS setup options described in this section are selected by choosing the appropriate text from the Main BIOS Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options (see on next page).

When you first power on the computer, the AwardBIOS™ is immediately activated.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing <Del> immediately after turning the system on, or
2. When the following message appears briefly at the bottom of the screen during the POST (Power On Self-Test), press the <Del> key to activate the Main Setup Menu.

Press DEL to enter SETUP

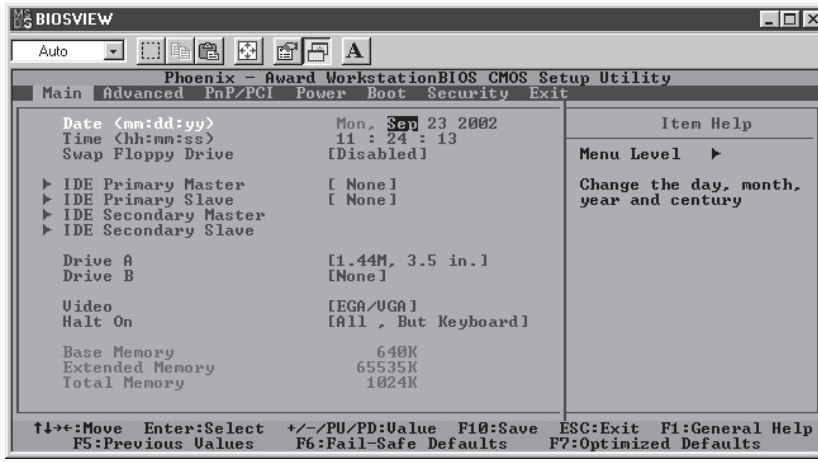
7-3 Main BIOS Setup

All Main Setup options are described in this section. The Main BIOS Setup screeen is displayed below.

Use the <Up> <Down> arrow keys or the <Tab> key to move among the different settings in the above menu.

Press the <Esc> key to exit theCMOS Setup Menu and use the <Left> <Right> arrow keys to enter the the other categories of BIOS settings. The next section is described in detail to illustrate how to navigate through the menus.

Main BIOS Setup Menu


BIOSVIEW
Auto
Phoenix - Award WorkstationBIOS CMOS Setup Utility
Main Advanced PnP/PCI Power Boot Security Exit
Date (mm:dd:yy) Mon, Sep 23 2002
Time (hh:mm:ss) 11 : 24 : 13
Swap Floppy Drive [Disabled]
IDE Primary Master [None]
IDE Primary Slave [None]
IDE Secondary Master
IDE Secondary Slave
Drive A [1.44M, 3.5 in.]
Drive B [None]
Video [EGA/VGA]
Halt On [All , But Keyboard]
Base Memory 640K
Extended Memory 65535K
Total Memory 1024K
Item Help
Menu Level ▶
Change the day, month, year and century
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Date/Time

Set the system date and time. Key in the correct information in the "mm", "dd" and "yy" fields. Press the "Enter" key to save the data.

Swap Floppy Drive

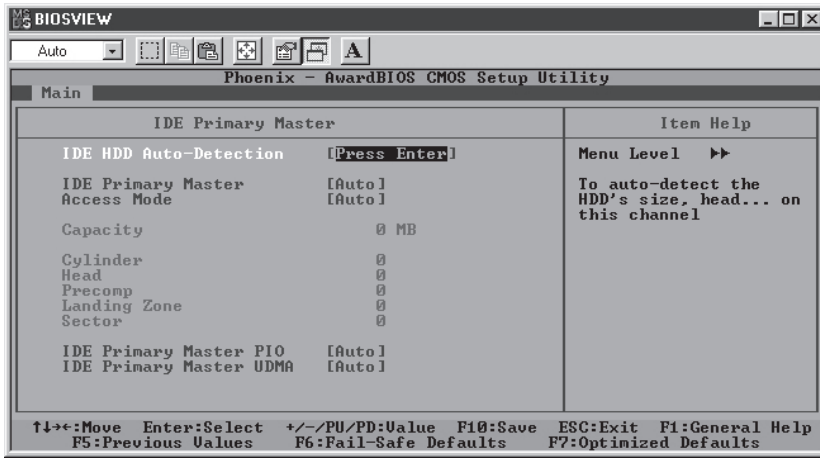
This setting allows the user to swap the designation (A and B) of the floppy disk drives installed in the system (if there are two floppy disk drives installed on the mainboard). The options are "**Disabled**" and "Enabled".

IDE Primary Master/IDE Primary Slave/IDE Secondary Master/IDE Secondary Slave

These options allow the user to set the parameters of the IDE Primary Master/Slave and IDE Secondary Master/Slave slots. Press "Enter" to activate the following sub-menu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the sub-menu are listed below:

IDE HDD Auto-Detection

Press the <Enter> key to activate the "IDE HDD Auto-Detection" function, which will allow BIOS to automatically detect the status of the IDE HDD installed in the system, such as the size and number of cylinders.



IDE Primary Master

This option allows the user to determine the manner in which the AwardBIOS sets the settings for the IDE Primary Master Device. The options are "None", "**Auto**" and "Manual."

Access Mode

This item determines the location through which the AwardBIOS accesses the IDE Primary Master Device. The settings are "CHS", "LBA", "Large", and "**Auto**".

IDE Primary Slave PIO

See the previous setting for description. The options for this setting are "**Auto**", "Mode 0", "Mode 1", "Mode 2", "Mode 3" and "Mode 4".

IDE Primary Master UDMA

This is available only when your IDE drive supports UDMA and the operating environment also includes a UDMA drive. If your IDE hard drive and your system software both support UDMA, select Auto to enabled BIOS support. The options for this setting are "**Auto**" and "Disabled".

Drive A/Drive B

These settings allow the user to set the type of floppy disk drive installed in the system. The options are "None", "360K, 5.25 in", "1.2M, 5.25 in", "720K, 3.5 in", "1.44M, 3.5 in" and "2.88M, 3.5 in". Default settings are "1.44, 3.5" in for Drive A and "None" for Drive B.

Video

Use this setting to specify the type of display you are using with the system. Options are "**EGA/VGA**", "CGA 40", "CGA 80" and "MONO".

Halt On

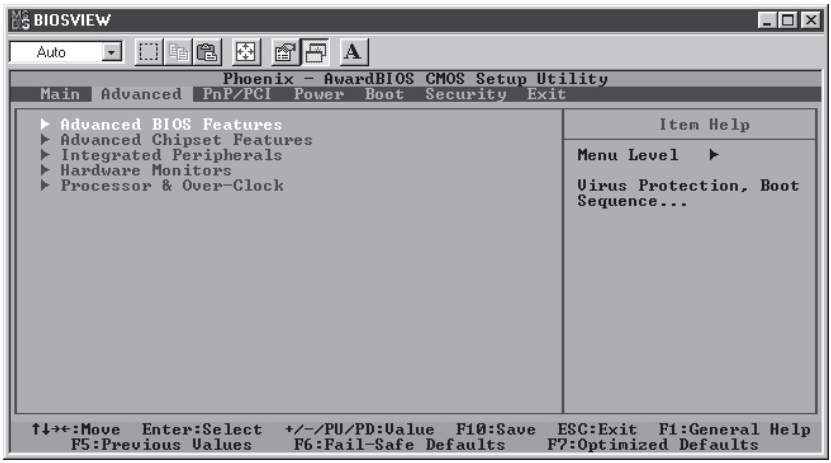
If the system encounters a non-specified error during boot-up, it will come to a halt as directed by these settings. You can tell the system to halt on "All Errors", "No Errors", "**All, But Keyboard**", "All, But Diskette" or "All, But Disk/Key".

Base Memory/Extended Memory/Total Memory

These are displays that inform you how much of each type of memory is recognized as being present in the system.

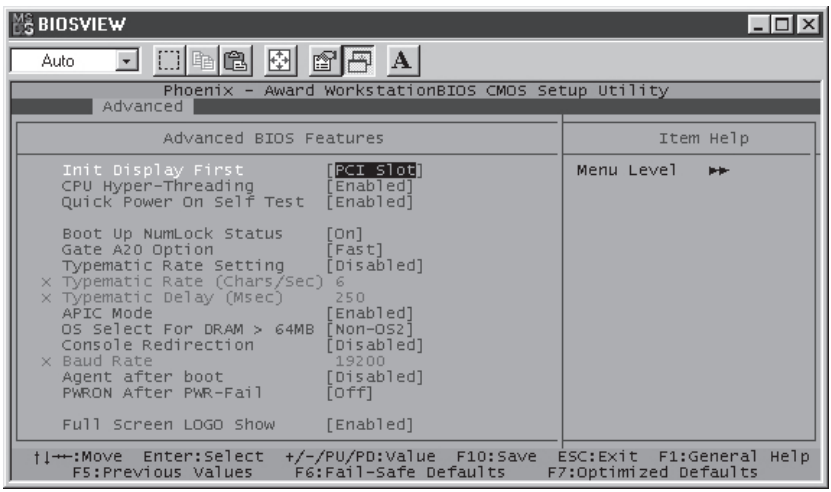
7-4 Advanced BIOS Setup

Choose Advanced BIOS Setup from the Award BIOS main menu with the Left/ Right arrow keys. You should see the following display. Select one of the items in the left frame of the screen to go to the sub screen for that item. Advanced BIOS Setup options are displayed by highlighting the option using the arrow keys. All Advanced BIOS Setup options are described in this section.



7-4.1 Advanced BIOS Features

When the item of Advanced BIOS Features is highlighted, press the <Enter> key to activate the screen below:


BIOSVIEW
Auto
Phoenix - Award WorkstationBIOS CMOS Setup Utility
Advanced
Advanced BIOS Features
Item Help
Menu Level ▶▶
Init Display First [PCI Slot]
CPU Hyper-Threading [Enabled]
Quick Power On Self Test [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Typematic Rate Setting [Disabled]
× Typematic Rate (Chars/Sec) 6
× Typematic Delay (Msec) 250
APIC Mode [Enabled]
OS Select For DRAM > 64MB [Non-OS2]
Console Redirection [Disabled]
× Baud Rate 19200
Agent after boot [Disabled]
PWRON After PWR-Fail [Off]
Full Screen LOGO Show [Enabled]
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Init Display First

This setting allows the user to determine which device will be first displayed when the sytem boots up - a device installed in the PCI slot or a device intalled in the AGP slot. The options are "PCI slot" and "**Onboard/AGP**".

Quick Power-On Self Test

If enabled, this feature will speed up the POST (Power On Self Test) routine after the computer is switched on. The settings are "**Enabled**" and "Disabled". If "Disabled", the POST will run at normal speed.

Boot Up NumLock Status

This option enables the system to check the status of the NumLock key during boot-up. The settings are "**On**" and "Off".

Gate A20 Option

This option allows the user to determine if the chipset or the keyboard controller should have the control over Gate A20. The settings are "Normal" or "**Fast**". If set to "Normal", a pin in the keyboard controller controls Gate A20. If "Fast" is selected, the chipset will have the control over Gate A20.

Typematic Rate Setting

If enabled, the option allows the user to set the number of times a key stroke repeats itself in a second when the key is held down. If disabled, the keyboard controller sets the rate.

Typematic Rate (Chars/Sec)

You may change this setting only if the Typmatic Rate Setting is enabled. This setting allows the user to set the number of times a key stroke repeats itself in a second when the key is held down. The options are: "**6**", "8", "10", "12", "15", "20", "24" and "30."

Typematic Delay

You may change this setting only if the Typmatic Rate Setting is enabled. This setting sets the delay time after a key is held down before

it begins to repeat the keystroke. The settings are: "**250**", "500", "750" and "1000."

APIC Mode

This setting allows you to **Enable** or Disable APIC. APIC is used to assign interrupt signals to a specific processor on multi-processor system and provides IRQs beyond the conventional 16 under Windows 2000 or XP. It has no effect on single processor systems.

OS Select For DRAM > 64MB

This setting should be changed only if using OS2 and your system has more than 64 MB of RAM. The options are "OS2" and "**Non-OS2**".

Console Redirection

When Enabled, the console (display) can be redirected via the COM port. When **Disabled**, console redirection is attempted only if keyboard is absent.

Agent After Boot

When Enabled, the agent will continue running after boot up. The default setting is **Disabled**.

PWRON After PWR-Fail

This setting allows the user to specify how the system will respond when power is reapplied after the system has gone down due to a power failure. The options are "**Off**", "On" and "Former-Sts".

Full Screen Logo Show

The options for this setting are "Enabled" and "**Disabled**". This refers to the logo that appears when your computer boots up.

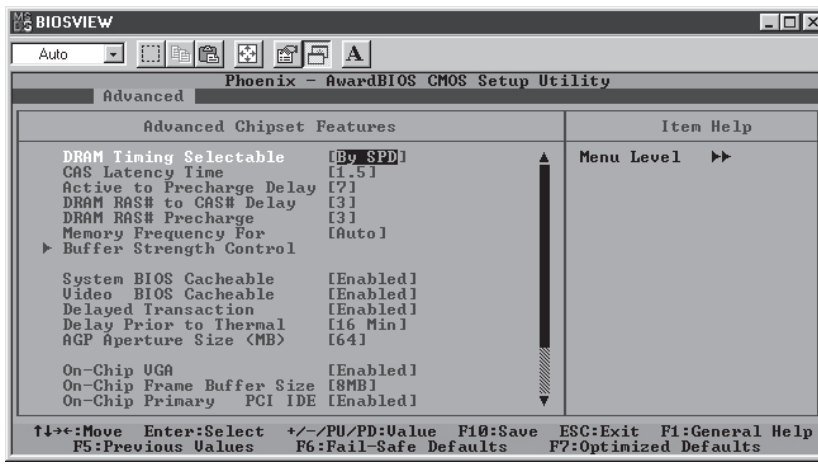
Voice Warning Output (P4SGA/P4SGL only)

This setting allows you to turn the Voice BIOS on or off. Voice BIOS is a new feature that gives you verbal (spoken) details of the POST (Power On

Self Test) routine that runs during system boot. This output is available in several languages - use the Voice BIOS software (included on the CD that came with the motherboard) to choose a different language. Remember, you will need sound output enabled and set up to use this feature. See Section 2-9 for more details. The options for this setting are "**Enabled**" and "Disabled".

7-4.2 Advanced Chipset Features

This section covers the functions used for configuring the system based upon the special features offered by the Plumas chipset. The chipset manages the operations of major components of the board. Normally, the default settings for the Advanced Chipset Features listed in the section are pre-configured by the manufacturer for the optimal performance of the system. It is recommended that the user does not alter the default settings. This section is provided as an emergency measure for the user to restore the functions of the system when the critical data stored in the BIOS is lost.


BIOSVIEW
Auto
Phoenix - AwardBIOS CMOS Setup Utility
Advanced
Advanced Chipset Features
Item Help
DRAM Timing Selectable [By SPD]
CAS Latency Time [1.5]
Active to Precharge Delay [7]
DRAM RAS# to CAS# Delay [3]
DRAM RAS# Precharge [3]
Memory Frequency For [Auto]
Buffer Strength Control
System BIOS Cacheable [Enabled]
Video BIOS Cacheable [Enabled]
Delayed Transaction [Enabled]
Delay Prior to Thermal [16 Min]
AGP Aperture Size (MB) [64]
On-Chip VGA [Enabled]
On-Chip Frame Buffer Size [8MB]
On-Chip Primary PCI IDE [Enabled]
Menu Level
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

DRAM Timing Selectable

This item regulates dynamic random access memory (DRAM) timing. The options are "Manual" and "**By SPD**".

CAS Latency TIme

This item regulates memory column address strobe (CAS) timing. The settings are "**1.5**", "2", "2.5" and "3".

Active to Precharge Delay

This item regulates the number of memory clock cycles allowed for memory refresh charging. The options are "**7**", "6" and "5". Shorter timings increase system memory throughput at the risk of lacking sufficient refresh charge.

DRAM RAS# to CAS# Delay

This item regulates the number of memory closk cycles between strobing a row address (RAS) and a column address (CAS). Shorter numbers of clock cycles improve system memory performance at the risk of missing data. The options are "**3**" and "2".

DRAM RAS# Precharge

This item regulates the number of system memory clock cycles for RAS precharging. The options are "**3**" and "2".

Memory Frequency For

This item regulates system memory frequency. The options are "PC100", "PC133" and "**Auto**".

Buffer Strength Control

Highlighting this item and pressing <Enter> will display a sub menu that allows you to control various buffer strengths.

System BIOS Cacheable

If enabled, the system BIOS information stored in the BIOS ROM (Read Only Memory) chip will be written and temporarily stored in the "cacheable" memory section of the CPU, giving the CPU faster access to the information. The options are "Disabled" and "**Enabled**".

Video BIOS Cacheable

If enabled, the information regarding the Video BIOS stored in the BIOS ROM (Read Only Memory) chip will be written and temporarily stored in the "cacheable" memory section of the CPU, giving the CPU faster access to the information. The options are "**Disabled**" and "Enabled".

Delayed Transaction

This setting compensates for the slower speed of ISA cards on a PCI interface and so is only relevant if ISA cards are present on the motherboard. The options are "**Enabled**" and "Disabled".

Delay Prior to Thermal

The options for this setting are "4 Min", "8 Min", "**16 Min**" and "32 Min".

AGP Aperture size (MB)

This setting allows the user to set the aperture size for the Accelerated Graphics Port (AGP). The options are "4", "8", "16", "32", "**64**", "128" and "256" (MB).

On-Chip VGA

The 845G chipset features high-performance on-chip graphics. You can use this setting to disable the integrated graphics if you wish to use a graphics add-on card in the 4xAGP Pro slot. The options for this setting are "**Enabled**" and "Disabled".

On-Chip Frame Buffer Size

This setting is for seeting the frame buffer size for the integrated graphics. The options for this setting are "**8MB**" and "1MB".

On-Chip Primary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately. The options for this setting are "**Enabled**" and "Disabled".

On-Chip Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately. The options for this setting are "**Enabled**" and "Disabled".

USB Controller

You should Enable this setting if your system contains a Universal Serial Bus (USB) controller (it does) and you have USB peripherals. The options for this setting are "**Enabled**" and "Disabled".

USB Keyboard Support

If enabled, this setting allows the user to activate the BIOS support of the On-Chip USB Keyboard Controller. The options are "**Disabled**" and "Enabled".

Onboard LAN Control

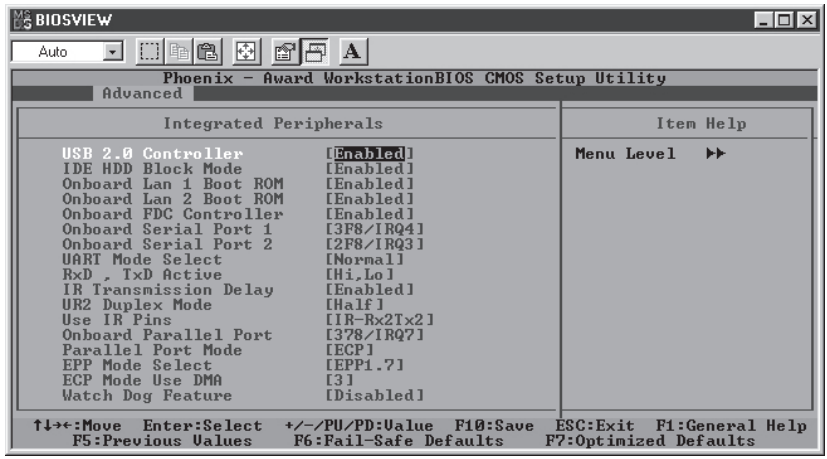
This setting allows the user to activate BIOS support for the onbaord LAN (Ethernet) port. The options for this setting are "**Enabled**" and "Disabled".

AC 97 Audio

This setting allows the user to activate BIOS support for AC'97 audio. The options for this setting are "**Enabled**" and "Disabled".

7-4.3 Integrated Peripherals

When the item "Integrated Peripherals" is highlighted, press the <Enter> key to activate the following sub-menu screen.


BIOSVIEW
Auto
Phoenix - Award WorkstationBIOS CMOS Setup Utility
Advanced
Integrated Peripherals
Item Help
USB 2.0 Controller [Enabled]
IDE HDD Block Mode [Enabled]
Onboard Lan 1 Boot ROM [Enabled]
Onboard Lan 2 Boot ROM [Enabled]
Onboard FDC Controller [Enabled]
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
UART Mode Select [Normal]
RxD , TxD Active [Hi,Lo]
IR Transmission Delay [Enabled]
UR2 Duplex Mode [Half]
Use IR Pins [IR-Rx2Tx2]
Onboard Parallel Port [378/IRQ7]
Parallel Port Mode [ECP]
EPP Mode Select [EPP1.7]
ECP Mode Use DMA [3]
Watch Dog Feature [Disabled]
Menu Level ▸▸
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

USB 2.0 Controller

Select "Enabled" to enable USB 2.0 on your motherboard. The settings are "**Enabled**" and "Disabled"

IDE HDD Block Mode

Select "Enabled" to allow automatic detection of the optimal number of block read/writes per sector that the IDE drive can support. The settings are "**Enabled**" and "Disabled".

Onboard LAN 1/2 Boot ROM

This setting allows you to decide whether to Enable invoking the boot ROM of the onboard chip for LAN 1/2. The settings are "**Enabled**" and "Disabled".

Onboard FDC Controller

Select "Enabled", if your system has a floppy disk controller (FDC) installed on the main board and you wish to use it. The settings are "**Enabled**" and

"Disabled".

Onboard Serial Port 1/Port 2

This setting allows the user to set the address and the corresponding IRQ for the Serial Port1 and Serial Port 2. The options are "Disabled" , "3F8/IRQ4", "2F8/IRQ3", "3E8/IRQ4", "2E8/IRQ3", and "Auto". The default setting for Serial Port1 is "**3F8/IRQ4**" and the default for Port 2 is is "**2F8/IRQ3**".

UART Mode Select

This setting allows the user to select the UART mode for BIOS. The options are "IrDA", "ASKIR" and "**Normal**".

RxD, TxD Active

This allows the user to change the settings for the "RxD, TxD Active" function. The options are "Hi, Hi", "**Hi, Lo**", "Lo, Hi", and "Lo, Lo".

IR Transmission Delay

If "Enabled", the transmssion of IR (infrared) signals will be delayed. The options are "**Enabled**" and "Disabled".

UR2 Duplex Mode

This setting set the mode for the UR2 Duplex Mode. The options are "Full" and "**Half**".

Use IR Pins

This item sets the usage of the IR pins. The options are "RxD2, TxD2" and "**IR-Rx2Tx2**".

Onboard Parallel Port

This setting allows the user to set the address and the corresponding IRQ for the onboard parallel port. The options are "Disabled", "**378/IRQ7**", "278/IRQ5" and "3BC/IRQ7".

Parallel Port Mode

This setting sets the mode for the onboard Parallel port. The options are "SPP," "EPP", "**ECP**" "ECP+EPP" and "Normal".

EPP Mode Select

This setting allows the user to select the EPP port type. The options are "EPP 1.9" and "**EPP 1.7**".

ECP Mode Use DMA

This setting allows the user to select the DMA channel for the ECP mode (port) to use. The options are "1" and "**3**".

Game Port Address (P4SGA/P4SGL only)

This setting allows the user to set the Game Port address. The options are "Disabled", "**201**" and "209."

Midi Port Address (P4SGA/P4SGL only)

This setting allows the user to set the Midi Port address. The options are "Disabled", "**330**", "300" and "290".

Midi Port IRQ (P4SGA/P4SGL only)

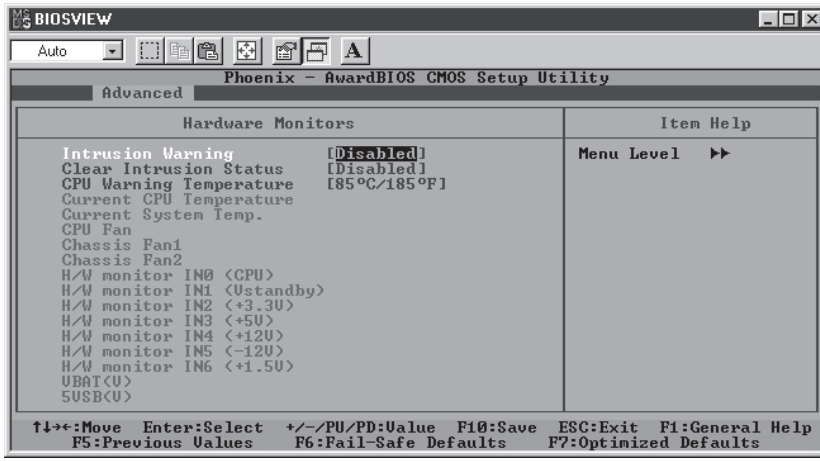
This setting allows the user to set the Midi Port IRQ. The options are "5" and "**10**".

Watch Dog Feature

This setting allows you to Enable or Disable the Watch Dog feature. You must also change the setting of the Watch Dog jumper to enable this function (see jumper settings in Chapter 2). Options are "**Enabled**" and "Disabled".

7-4.4 Hardware Monitors

When the item "Hardware Monitors" is highlighted, press the <Enter> key to activate the following sub-menu screen.



There are only three settings on this menu (below). The rest of this menu shows various temperatures and voltage levels as indicated.

Intrusion Warning

This setting enables or disables the chassis intrusion feature, which you may want to use to protect your system. The options are "Enabled" and "**Disabled**".

Clear Intrusion Status

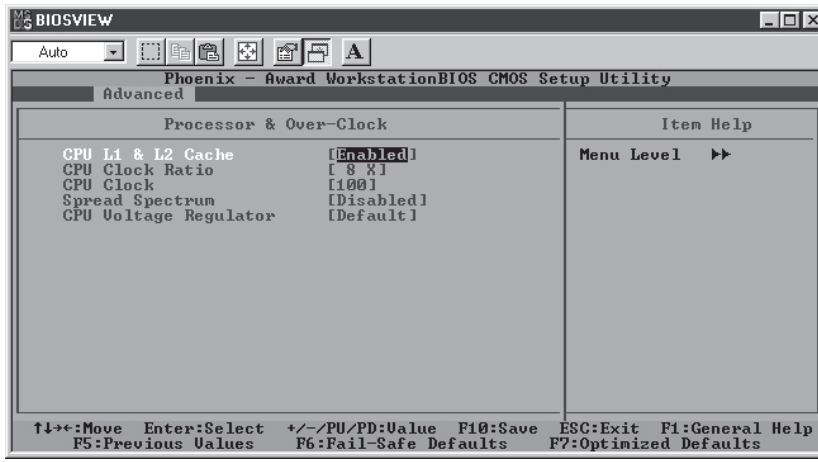
After being notified of a chassis intrusion, enable this setting to clear the condition. If you don't, the Voice BIOS will notify you of a chassis intrusion everytime the system boots. The options are "Enabled" and "**Disabled**".

CPU Warning Temperature

This allows you to set the CPU warning temperature. If the CPU temperature reaches this threshold, an alarm will activate and a warning message will be displayed onscreen. The options are "Disabled", "60°C/140°F", "65°C/149°F", "70°C/158°F", "75°C/167°F", "80°C/176°F" and "**85°C/185°F**".

7-4.5 Processor & Over-Clock

When the item "Processor Features" is highlighted, hit the <Enter> key to activate the sub-menu shown below:



CPU L1 & L2 Cache

Set this option to "Enable" to activate the function of CPU L1 and L2 cache. The settings are "Disabled" and "**Enabled**".

CPU Clock Ratio

This item allows the user to change the CPU/Clock ratio. Key in any whole number between (and including) 8 and 50. The default setting is **"8x**".

CPU Clock

Key in a number between 100 and 165 to set the CPU clock (MHz). Supermicro does not recommend or make any guarantees with CPU overclocking.

Spread Spectrum

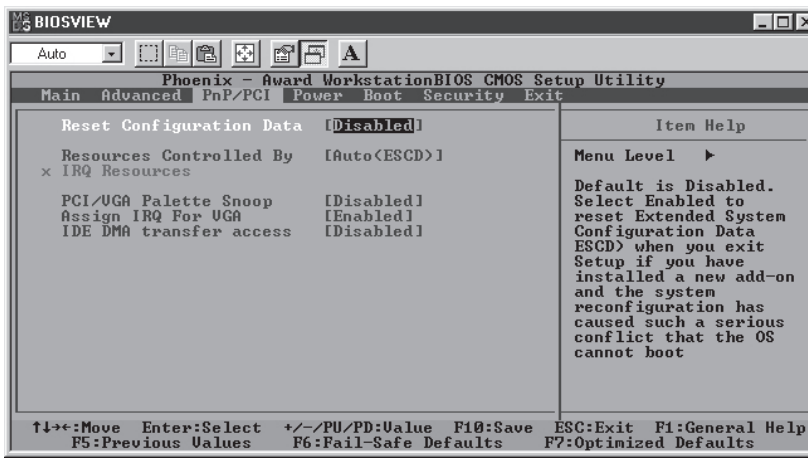
Spread Spectrum is a technique used to stabilize operation when a system is being affected by electromagnetic interference. The options for this setting are +/- 0.25%", "- 0.5%", "+/- 0.5%", "+/- 0.38%" and "**Disabled**".

CPU Voltage Regulator

If you overclock your CPU, it may be necessary to increase the voltage supplied to the CPU. This setting allows you to do this. The options are "-0.050V", "-0.025V", "**Default**", "+0.025V", "+0.050V" "+0.100V", "+0.150V" and "0.200V". Supermicro does not recommend or make any guarantees with CPU overclocking.

7-5 PCI/PnP Configurations

Choose PCI/PnP Configurations from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:


BIOSVIEW
Auto
Phoenix - Award WorkstationBIOS CMOS Setup Utility
Main Advanced PnP/PCI Power Boot Security Exit
Reset Configuration Data [Disabled]
Resources Controlled By [Auto(ESCD)]
x IRQ Resources
PCI/VGA Palette Snoop [Disabled]
Assign IRQ For VGA [Enabled]
IDE DMA transfer access [Disabled]
Item Help
Menu Level ▶
Default is Disabled. Select Enabled to reset Extended System Configuration Data ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Reset Configuration Data

Enabling this setting resets the extended system configuration data when you exit setup. Do this when you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot reboot the system. The options are "Enabled" and "**Disabled**".

Resources Controlled By

This setting allows BIOS to automatically configure all boot and Plug and Play compatible devices. If you choose Auto, you cannot select the IRQ, DMA and memory base address fields, because BIOS automatically assigns them. The options are "**Auto <ESCD>**" and "Manual".

PCI/VGA Palette Snoop

For best system performance, this item has been pre-set to "Disabled" by the manufacturer. The settings are "Enabled" and "**Disabled**".

Assign IRQ for VGA

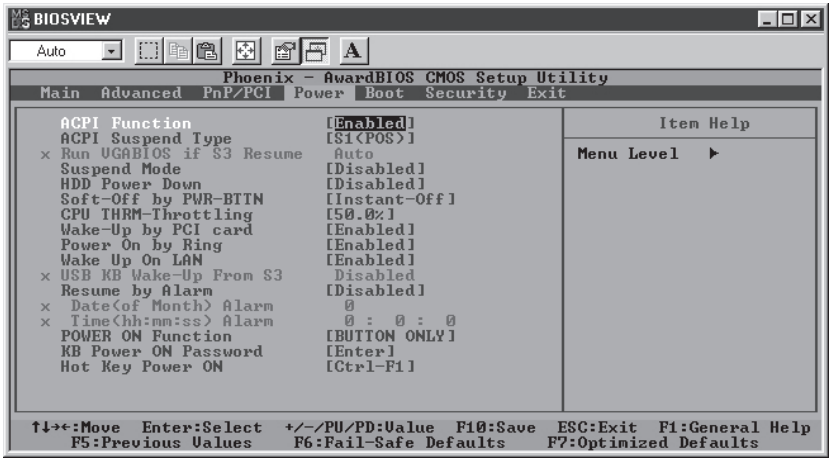
This setting allows you to assign an IRQ (Interrupt Request) for the VGA. The settings are **"Enabled"** and "Disabled".

IDE DMA Transfer Access

This setting is to allow access to UDMA when running in DOS mode. The settings are "Enabled" and "**Disabled**".

7-6 Power

Choose Power from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:


BIOSVIEW
Auto
Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced PnP/PCI Power Boot Security Exit
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
x Run VGABIOS if S3 Resume Auto
Suspend Mode [Disabled]
HDD Power Down [Disabled]
Soft-Off by PWR-BTTN [Instant-Off]
CPU THRM-Throttling [50.0%]
Wake-Up by PCI card [Enabled]
Power On by Ring [Enabled]
Wake Up On LAN [Enabled]
x USB KB Wake-Up From S3 Disabled
Resume by Alarm [Disabled]
x Date(of Month) Alarm 0
x Time(hh:mm:ss) Alarm 0 : 0 : 0
POWER ON Function [BUTTON ONLY]
KB Power ON Password [Enter]
Hot Key Power ON [Ctrl-F1]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

ACPI Function

This item allows you to enable and disable the ACPI (Advanced Configuration and Power Management) program. The options are "**Enabled**" and "Disabled".

ACPI Suspend Type

This item allows the user to determine the ACPI Suspend type. The options are "**S1 (POS)**", "S3 (STR)" and "S1&S3". The "S1&S3" setting should be used only with Windows XP operating systems.

Run VGABIOS if S3 Resume

This item will only be changeable if the ACPI Suspend Type (above) is set to S3. Enabling this will initiate the VGA BIOS for the S3 mode. Options are "**Auto**", "Yes" and "No".

Suspend Mode

This item sets the period of time that passes before the system goes into suspend mode. The options are "**Disabled**", "1min", "2min", "4min", "8min", "12min", "20min", "30min", "40min" and "1hr".

HDD Power Down

This item sets the period of time that passes before the hard drive(s) is powered down. The options are "**Disabled**", "1min", "2min", "3min", "4min", "5min", "6min", "7min", "8min", "9min", "10min", "11min", "12min" "13min", "14min" and "15min".

Soft-Off by PWR-BTTN

This item determines the system's "Soft-off" mode when the user presses the power-button. The options for this setting are "**Instant-Off**" and "Delay 4 sec".

CPU THRM-Throttling

THRM throttling is used to lower power consumption and reduce the heat gererated by the CPU. The options for this setting are "87.5%", "75%", "62.5%", "**50%**", "37.5%", "25%' and "12.5%'.

Wake-Up by PCI Card

If Enabled, the user is able to "wake up" the system via a PCI card. The settings are "**Enabled**" and "Disabled".

Power On by Ring

If Enabled, the user is able to "wake up" the system via the modem. The options for this setting are "**Enabled**" and "Disabled".

Wake Up on LAN

If Enabled, the user is able to "wake up" the system via the LAN. The options for this setting are "**Enabled**" and "Disabled".

USB KB Wake Up From S3

This item is only changeable if the ACPI Suspend Type (above) is set to S3. Enabling this will allow you to wake-up the system by depressing a button on a USB-connected keyboard. Options are "Enabled" and "**Disabled**".

Resume by Alarm

If Enabled, this setting will allow the AwardBIOS to turn on the system via the real-time clock (RTC). The options are "Enabled" and "**Disabled**".

Date (of Month) Alarm

Set the date for RTC alarm wake up in this field.

Time (hh:mm:s) Alarm

Set the time for RTC alarm wake up in this field.

POWER ON Function

This setting allows the user to determine the method by which the system power is activated. The options are "Password", "Hot Key", "Mouse Left", "Mouse Right", "Any Key", "**Button Only**" and "Keyboard 98".

KB Power On Password

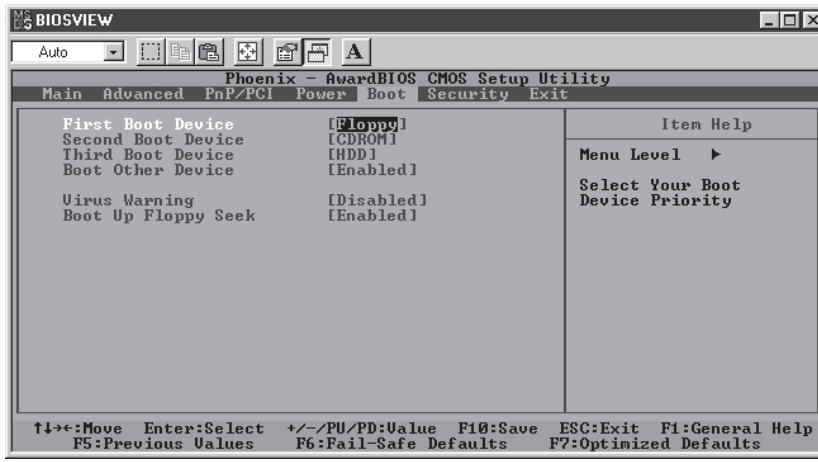
This setting allows the user to set the password to activate the Power On function through the keyboard. Press <Enter> to enter the password.

Hot Key Power On

This option allows the user to set the hot key to activate the power on function. The settings are "**Ctrl F1**", "Ctrl F2", "Ctrl F3", "Ctrl F4", "Ctrl F5", "Ctrl F6", "Ctrl F7", "Ctrl F8", "Ctrl F9", "Ctrl F10", "Ctrl F11" and "Ctrl F12".

7-7 Boot

Choose Boot from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:


BIOSVIEW
Auto
Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced PnP/PCI Power Boot Security Exit
First Boot Device [Floppy]
Second Boot Device [CDROM]
Third Boot Device [HDD]
Boot Other Device [Enabled]
Virus Warning [Disabled]
Boot Up Floppy Seek [Enabled]
Item Help
Menu Level ▶
Select Your Boot Device Priority
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Award BIOS attempts to load the operating system from devices specified by the users in a user-specified sequence.

First Boot Device

This item allows the user to set the first boot-up device. The options are "**Floppy**", "LS120", "HDD", "SCSI", "CDROM", "ZIP100", "USB-FDD", "USB-ZIP", "USB-CDROM", "USB-HDD", "LAN" and "Disabled".

Second Boot Device

This item allows the user to set the second boot-up device. The options are "Floppy", "LS120", "HDD", "SCSI", "**CDROM**", "ZIP100", "USB-FDD", "USB-ZIP", "USB-CDROM", "USB-HDD", "LAN" and "Disabled".

Third Boot Device

This item allows the user to set the third boot-up device. The options are "Floppy", "LS120", "**HDD**", "SCSI", "CDROM", "ZIP100", "USB-FDD", "USB-ZIP", "USB-CDROM", "USB-HDD", "LAN" and "Disabled".

Boot Other Device

If enabled, this option enables the BIOS to load the OS from another device rather than the ones that have been specified as the first, second and third boot up devices. The settings are "**Enabled**" and "Disabled".

Virus Warning

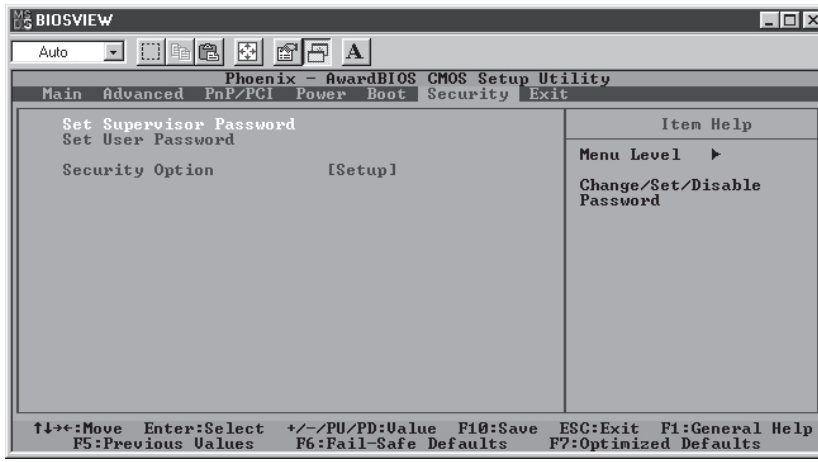
This item allows the user to choose the VIRUS Warning feature for IDE Hard Drive Disk boot sector protection. If this function is enabled and someone attempts to write data into this area, the BIOS will display a warning message and an alarm will sound. The settings are "Enabled", and "**Disabled**".

Boot Up Floppy Seek

Set this option to "Enabled" to allow the BIOS to test floppy drives to determine whether they have 40 tracks or 80 tracks. The settings are "**Enabled**" or "Disabled".

7-8 Security

Choose Security from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:



Set Supervisor Password

When the item "Set Supervisor Password" is highlighted on the above screen, press the <Enter> key. When prompted, type the Supervisor Password in the dialogue box to set or to change the Supervisor Password.

Set User Password

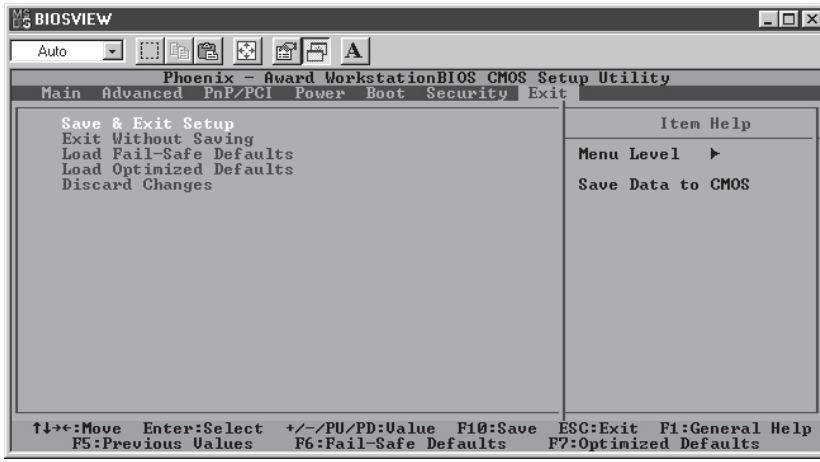
When the item "Set User Password" is highlighted on the above screen, press the <Enter> key. When prompted, type the User Password in the dialogue box to set or to change the User Password.

Security Option

This setting allows the user to determine if the password is required every time when the system boots up or if the password is required only when you enter the CMOS setup. The options are "System" and "**Setup**".

7-9 Exit

Choose Exit from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:



Save & Exit Setup

When the item "Save & Exit Setup" is highlighted, press <Enter> to save the changes you've made in the BIOS program (CMOS) and exit. Your system should, then, continue with the boot-up procedure.

Exit without Saving

When the item "Exit without Saving" is highlighted, press <Enter> to exit the Setup routine without saving any changes you may have made. Your system should then continue with the boot-up procedure.

Load Fail-Safe Defaults

Highlight this item and hit <Enter> to load the default settings for all items in the BIOS Setup. These are the safest settings to use.

Load Optimized Defaults

Highlight this item and hit <Enter> to load the optimized settings for all items in the BIOS Setup. These settings provide you with optimal system performance.

Discard Changes

When the item "Discard Changes" is highlighted, press <Enter> to discard any changes you made to the BIOS settings and to stay in BIOS Setup. Your system should then continue with the boot-up procedure.

Notes

Appendix A
BIOS POST Messages

During the Power-On Self-Test (POST), the BIOS will check for errors. If an error is found and a correction is needed, the BIOS will activate an alarm or display a message.

If a message is displayed, it will be accompanied by the following:

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

POST Beep Codes

Currently, there are two kinds of beep codes used in AwardBIOS. One code indicates that a video error has occurred and that the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps. The other code indicates that a Rambus error has occurred. This beep code consists of a single long beep that sounds repeatedly.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes messages for both the ISA and the EISA BIOS.

CMOS BATTERY HAS FAILED

The CMOS battery is no longer functional. It should be replaced.

CMOS CHECKSUM ERROR

The CMOS hecksum is incorrect. This can indicate that CMOS has been corrupted. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain the proper system boot files. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also make sure the disk has been formatted as a boot device. Then reboot the system.

DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

The type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.

DISPLAY SWITCH IS SET INCORRECTLY

The display switch on the motherboard can be set to either monochrome or color. This indicates that the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper or enter Setup and change the VIDEO selection.

DISPLAY TYPE HAS CHANGED SINCE LAST BOOT

Since last powering off the system, the display adapter has been changed. You must configure the system for the new display type.

ERROR ENCOUNTERED INITIALIZING HARD DRIVE

The hard drive cannot be initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

ERROR INITIALIZING HARD DISK CONTROLLER

Cannot initialize the controller. Make sure the cord is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly on the hard drive.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

Cannot find or initialize the floppy drive controller. Make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during boot up.

If you are intentionally configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

Memory Address Error at ...

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory parity Error at ...

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory Verify Error at ...

Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.

OFFENDING ADDRESS NOT FOUND

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

OFFENDING SEGMENT:

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

PRESS A KEY TO REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

FLOPPY DISK(S) fail (80) → Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40) → Floppy Type dismatch.

Hard Disk(s) fail (80) → HDD reset failed
Hard Disk(s) fail (40) → HDD controller diagnostics failed.

Hard Disk(s) fail (20) → HDD initialization error.

Hard Disk(s) fail (10) → Unable to recalibrate fixed disk.

Hard Disk(s) fail (08) → Sector Verify failed.

Keyboard is locked out - Unlock the key.

BIOS detect the keyboard is locked. P17 of the keyboard controller is pulled low.

Keyboard error or no keyboard present.

Cannot initialize the keyboard. Make sure that the keyboard is attached correctly and no keys are being pressed during the boot.

Manufacturing POST loop.

System will repeat POST procedure infinitely while the P15 of keyboard controller is pulled low. This is also used for M/B burn in testing.

BIOS ROM checksum error - System halted.

The checksum of ROM address F0000H-FFFFFH is bad.

Memory test fail..

BIOS reports the a memory test fail if the onboard memory has an error.

Appendix B
BIOS POST Codes

This section lists the POST (Power On Self Testing) Codes for the Award BIOS.

POST (hex)	Description
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
0h1	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	● Disable PS/2 mouse interface (optional). ● Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). ● Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.

Debug LED Encoding

Post Code	Encoded LED	Task
C1h	001b	Memory Detection
05h	010b	BIOS Shadowing
07h	011b	KBC Initialization
0Eh	100b	Shadow RAM test
14h	101b	Chipset defaults loaded
26h	110b	Clock generator configured
2Bh	111b	Video initialization
52h	000b	Just clear LEDs

POST (hex)	Description
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. 3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information. 4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. 5. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	• Program CPU internal MTRR (P6 & PII) for 0-640K memory address. • Initialize the APIC for Pentium class CPU. • Program early chipset according to CMOS setup. Example: onboard IDE controller. • Measure CPU speed. • Invoke video BIOS.
2Ah	Reserved
2Bh	Reserved
2Ch	Reserved

POST (hex)	Description
2Dh	1. Initialize multi-language 2. Put information on screen display, including Award title, CPU type, CPU speed ….
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34h	Reserved
35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45h	Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page. 2. Program writes allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved
50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.

POST (hex)	Description
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onboard_AUDIO switch.
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reserved
64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to “AUTO”.
6Eh	Reserved
6Fh	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
70h	Reserved
71h	Reserved
72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..
76h	Reserved
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved
7Fh	1. Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: ◆Clear EPA or customization logo.

POST (hex)	Description
80h	Reserved
81h	Reserved
82h	1. Call chipset power management hook. 2. Recover the text font used by EPA logo (not for full screen logo) 3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs.
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining
95h	1. Program daylight saving 2. Update keyboard LED & typematic rate
96h	1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

Notes

Appendix C
System Specifications

Processors
Single 478-pin Pentium 4 microPGA Intel® Pentium® 4 processors of up to 3.06 GHz with a 512KB integrated Advanced Transfer Cache or single Intel® Celeron® processors of up to 2.20 GHz with a 128KB integrated Advanced Transfer Cache at a 533/400 MHz system bus speed

Memory Capacity
2 DIMM slots to support a maximum of 2 GB unbuffered, non-ECC DDR-333/266/200 (PC2700/2100/1600) SDRAM

DIMM Sizes
256 MB / 512 MB / 1 GB 184-pin modules supported

Main Drive Bays
One (1) drive bay to house one (1) 3.5 x 1" IDE disk drive

Peripheral Bays
One (1) slim 3.5" floppy drive
One (1) slim CD-ROM drive

PCI Expansion Slots
One (1) 32-bit 33 MHz (5V) PCI slot (bundled with a 32-bit, 33 MHz 5V riser card)

Power Supply
Type: 1 x 200W with +3.3V, +5V, +12V, -5V and -12V main DC outputs and a 5V standby output.
Input Voltage: 100-240VAC (w/ ± 10% tolerance - units are auto-switching capable)
Fans: Two 4-cm ball bearing fans

Operating Environment
Operating Temperature: 10º to 35º C (50º to 90º F)
Non-operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 8% to 90% (non-condensing)
Non-operating Relative Humidity: 5 to 95% (non-condensing)

Cooling Fans
One (1) 10-cm ball bearing blower fan

Form Factor
P4SGE motherboard: ATX
SC512C chassis: 1U rackmount

Dimensions
16.7 x 1.7 x 14 in.; 425 x 44 x 356 mm (W x H x D)

Weight
Gross: 15.5 lbs. (7 kg.)

Regulatory Compliance
Electromagnetic Emissions:
FCC Class B, EN 55022 Class B, EN 61000-3-2/-3-3, CISPR 22 Class B

Electromagnetic Immunity:
EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety:
EN 60950/IEC 60950-Compliant
UL Listed (USA)
CUL Listed (Canada)
TUV Certified (Germany)
CE Marking (Europe)